Naturalized alien flora of the world: species diversity, taxonomic and phylogenetic patterns, geographic distribution and global hotspots of plant invasion

Naturalizovaná nepůvodní flóra světa: druhová diverzita, taxonomické a fylogenetické složení, geografické zákonitosti a globální ohniska rostlinných invazí

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Using the recently built Global Naturalized Alien Flora (GloNAF) database, containing data on the distribution of naturalized alien plants in 483 mainland and 361 island regions of the world, we describe patterns in diversity and geographic distribution of naturalized and invasive plant species, taxonomic, phylogenetic and life-history structure of the global naturalized flora as well as levels of naturalization and their determinants. The mainland regions with the highest numbers of naturalized aliens are some Australian states (with New South Wales being the richest on this continent) and several North American regions (of which California with 1753 naturalized plant species represents the world's richest region in terms of naturalized alien vascular plants). England, Japan, New Zealand and the Hawaiian archipelago harbour most naturalized plants among islands or island groups. These regions also form the main hotspots of the regional levels of naturalization, measured as the percentage of naturalized aliens in the total flora of the region. Such hotspots of relative naturalized species richness appear on both the western and eastern coasts of North America, in north-western Europe, South Africa, south-eastern Australia, New Zealand, and India. High levels of island invasions by naturalized plants are concentrated in the Pacific, but also occur on individual islands across all oceans. The numbers of naturalized species are closely correlated with those of native species, with a stronger correlation and steeper increase for islands than mainland regions, indicating a greater vulnerability of islands to invasion by species that become successfully naturalized. South Africa, India, California, Cuba, Florida, Queensland and Japan have the highest numbers of invasive species. Regions in temperate and tropical zonobiomes harbour in total 9036 and 6774 naturalized species, respectively, followed by 3280 species naturalized in the Mediterranean zonobiome, 3057 in the subtropical zonobiome and 321 in the Arctic. The New World is richer in naturalized alien plants, with 9905 species compared to 7923 recorded in the Old World. While isolation is the key factor driving the level of naturalization on islands, zonobiomes differing in climatic regimes, and socioeconomy represented by per capita GDP, are central for mainland regions. The 11 most widely distributed species each occur in regions covering about one third of the globe or more in terms of the number of regions where they are naturalized and at least 35% of the Earth's land surface in terms of those regions' areas, with the most widely distributed species *Sonchus oleraceus* occuring in 48% of the regions that cover 42% of the world area. Other widely distributed species are *Ricinus communis*, *Oxalis corniculata*, *Portulaca oleracea*, *Eleusine indica*, *Chenopodium album*, *Capsella bursa-pastoris*, *Stellaria media*, *Bidens pilosa*, *Datura stramonium* and *Echinochloa crus-galli*. Using the occurrence as invasive rather than only naturalized yields a different ranking, with *Lantana camara* (120 regions out of 349 for which data on invasive status are known), *Calotropis procera* (118), *Eichhornia crassipes* (113), *Sonchus oleraceus* (108) and *Leucaena leucocephala* (103) on top. As to the life-history spectra, islands harbour more naturalized woody species (34.4%) than mainland regions (29.5%), and fewer annual herbs (18.7% compared to 22.3%). Ranking families by their absolute numbers of naturalized species reveals that *Compositae* (1343 species), *Poaceae* (1267) and *Leguminosae* (1189) contribute most to the global naturalized alien flora. Some families are disproportionally represented by naturalized aliens on islands (*Arecaceae*, *Araceae*, *Acanthaceae*, *Amaryllidaceae*, *Asparagaceae*, *Convolvulaceae*, *Rubiaceae*, *Malvaceae*), and much fewer so on mainland (e.g. *Brassicaceae*, *Caryophyllaceae*, *Boraginaceae*). Relating the numbers of naturalized species in a family to its total global richness shows that some of the large species-rich families are over-represented among naturalized aliens (e.g. *Poaceae*, *Leguminosae*, *Rosaceae*, *Amaranthaceae*, *Pinaceae*), some under-represented (e.g. *Euphorbiaceae*, *Rubiaceae*), whereas the one richest in naturalized species, *Compositae*, reaches a value expected from its global species richness. Significant phylogenetic signal indicates that families with an increased potential of their species to naturalize are not distributed randomly on the evolutionary tree. *Solanum* (112 species), *Euphorbia* (108) and *Carex* (106) are the genera richest in terms of naturalized species; over-represented on islands are *Cotoneaster*, *Juncus*, *Eucalyptus*, *Salix*, *Hypericum*, *Geranium* and *Persicaria*, while those relatively richer in naturalized species on the mainland are *Atriplex*, *Opuntia*, *Oenothera*, *Artemisia*, *Vicia*, *Galium* and *Rosa*. The data presented in this paper also point to where information is lacking and set priorities for future data collection. The GloNAF database has potential for designing concerted action to fill such data gaps, and provide a basis for allocating resources most efficiently towards better understanding and management of plant invasions worldwide.

Keywords: alien species, distribution, Global Naturalized Alien Flora (GloNAF) database, invasive species, islands, life history, mainland, naturalized species, phylogeny, plant invasion, regional floras, species richness, taxonomy, zonobiome

Introduction

Much of the current theory of biological invasions is based on macroecological analyses of regional floras (Cadotte et al. 2006, Richardson & Pyšek 2006, Pyšek & Richardson 2007, Fridley 2008). However, until recently the availability of such data on vascular plants remained geographically restricted, in sharp contrast to other taxonomic groups where global distribution data are available and have been analysed, such as birds (Blackburn & Duncan 2001, Blackburn et al. 2008, 2009, Dyer et al. 2017), mammals (Long 2003), reptiles (Krauss 2009, 2015), molluscs (Capinha et al. 2015) and bryophytes (Essl et al. 2015). This lack of vascular plant data has been particularly limiting because research using global datasets can inform about the mechanisms of invasion. The ordering of species into different stages in the invasion process (Richardson et al. 2000, Pyšek et al. 2004, Blackburn et al. 2011), including their proportional success in passing particular stages (Williamson & Brown 1986, Williamson & Fitter 1996, Jeschke & Strayer 2005) can reveal species traits and factors that, depending on invasion context, separate successful invaders from those that fail (Williamson 2006, Fridley 2008, Pyšek et al. 2009a, b, 2015, Richardson & Pyšek 2012). Solid information on alien species distributions over the globe is hence a key requirement for robust exploration of many research questions in invasion ecology, for better understanding of invasion mechanisms, and eventually for informing decision making.

The last decade has thus seen rapid development of numerous alien species databases, ranging in extent from regional to continental, built with the aim of collecting information on alien species status, distribution, pathways, impacts and other characteristics (Hulme & Weser 2011). One such effort was the European DAISIE project, which at the time was exceptional in terms of covering all major taxa and biomes for a whole continent and because the data were purposely collected based on standardized criteria (DAISIE 2009, Hulme et al. 2010, Pyšek et al. 2011). The product of this initiative, the DAISIE database and associated gateway (www.europe-aliens.org), became a standard data source for alien plant species in Europe that allowed addressing new research questions (e.g. Winter et al. 2009, Pyšek et al. 2010, Essl et al. 2011, Feng et al. 2016), informed European policy on invasive alien species (Hulme et al. 2009, Kettunen et al. 2009), and stimulated more practical work on national inventories and assessment of invasion impacts (e.g. Brundu & Richardson 2016, Hoffmann & Broadhurst 2016, Pergl et al. 2016a, b). Based on the DAISIE database, Lambdon et al. (2008) provided a comprehensive analysis of the species composition and structure of regional floras in Europe, but such a detailed account has until now remained available only for this continent. Another major European alien species inventory compiled over the last decades is the North European and Baltic Network on Invasive Alien Species (NOBANIS; www.nobanis.org), a joint effort of 18 European countries (Hulme & Weser 2011). For other continents, a comprehensive database, primarily focused on native taxa but also including the distribution of a complete alien flora, is the regularly updated BONAP database (Kartesz & Meacham 1999, Kartesz 2015), which has been used in a number of intercontinental analyses of plant invasions (Winter et al. 2010, Dawson et al. 2013, Kalusová et al. 2013, Pyšek et al. 2015, van Kleunen et al. 2015). However, BONAP has not yet been used for a thorough taxonomic description of the patterns in the alien flora of North America.

Besides those rather rare continental data collections, comprehensive information on complete alien floras is usually restricted to the regional or country level (e.g. South Africa: Henderson 2011, Chile: Fuentes et al. 2013), relates to a specific life history such as woody species (Richardson & Rejmánek 2004, Rejmánek & Richardson 2013, Oswalt et al. 2015), or otherwise specific circumstances such as invasive species in natural habitats (Weber 2003).

One effort towards obtaining a global coverage of plant invasions needs to be acknowledged, i.e. the compilation of the "Global Compendium of Weeds" (Randall 2002, 2012). This resource has been used to provide estimates of the global success of individual alien species in studies relating invasiveness to species traits and other factors (Pyšek et al. 2009a, Dawson et al. 2011, Dostál et al. 2013). As a valuable compilation of a large quantity of species lists from all over the world, it is nevertheless constrained by limitations such as overlapping and unclear criteria for species' inclusion and status and should therefore be used as a rather general indicator of invasiveness for addressing larger-scale questions, as pointed out by Dawson et al. (2013). These authors concluded that existing distribution data should be integrated in a more sophisticated manner than simply compiling lists, e.g. by using common units of distribution in order to capture how widespread alien plant species are and to allow comparisons among species. Such an exhaustive synthesis of existing regional distributions should provide a more accurate index of the global invasiveness of species (Dawson et al. 2013).

Since the origin of invasion ecology as a distinct research field, understanding the macroecological and biogeographic patterns in the distribution of alien plants has been one of the foremost challenges. Studies based on species numbers from multiple regions (e.g. Rejmánek & Randall 1994, Rejmánek 1996, Vitousek et al. 1997, Sax 2001) provided important insights into how widespread a phenomenon invasions are and raised awareness of the problem within the scientific community and among relevant authorities. For obvious reasons, however, analyses based purely on species numbers are necessarily limited in that they cannot address the taxonomic and phylogenetic context, or track species exchange among regions. It is thus analyses based on the detailed knowledge of species composition that bring potentially novel insights (e.g. Winter et al. 2009, 2010, van Kleunen et al. 2015). The lack of comprehensive data on alien plant species from across the globe has hampered progress in understanding the patterns and processes that govern invasions, and in the development of adequate management responses. Surprisingly, despite the obvious need for a comprehensive global database on alien plants, no such database existed until recently.

The present paper is based on the recently built Global Naturalized Alien Flora (GloNAF; https://glonaf.org) database that has up to now been used to explore the global flows of alien species and their accumulation across continents (van Kleunen et al. 2015). In addition, it has been used to test some of the central hypotheses in invasion biology by relating naturalized species distributions to species traits (Dellinger et al. 2016, Razanajatovo et al. 2016), and to model the risks of future invasions (Klonner et al. 2017). Among the main findings so far are that climate change will increase the naturalization risk from alien garden plants in Europe (Dullinger et al. 2017), and that emerging economies in megadiverse countries are regions most vulnerable to future plant invasions because of the interaction of global trade and climate change (Seebens et al. 2015). GloNAF has also been used to demonstrate that niche dynamics of alien species do not differ between sexual and apomictic flowering plants (Dellinger et al. 2016). Razanajatovo et al. (2016) used GloNAF and found that selfing ability drives global naturalization of alien plants directly as well as indirectly owing to correlations with monocarpy and a large native range size, which both promote naturalization success.

Here, we use GloNAF to summarize (i) patterns in diversity and geographic distribution of naturalized and invasive plant species, (ii) relationships between the numbers of naturalized, invasive and native species, and (iii) levels of naturalization on mainland and island regions. We provide a different angle compared with previous analyses (van Kleunen et al. 2015) by focusing on factors that interact in determining which regions are highly or little invaded. With this background, we present the main topics of this paper, which are to (iv) describe the taxonomic, phylogenetic and life-history structure of the global naturalized flora, and (v) provide information on the distribution of the globally most widespread naturalized species, genera and families.

Methods

Compilation of data on naturalized alien floras: GloNAF database

The present paper provides information on numbers of naturalized, invasive and native species in particular regions of the world (Appendix 1). The source for the numbers of naturalized species is the GloNAF database version 1.1 (van Kleunen et al. 2015), which was compiled between 2011–2015 by the GloNAF core team (WD, FE, HK, JP, PP, MvK, PW and MW) with contribution from the other authors of the present paper. GloNAF 1.1 contains inventories of naturalized alien plant species, including infraspecific and hybrid taxa, for 844 non-overlapping regions around the globe (see van Kleunen et al. 2015 for details on database compilation and Electronic Appendix 1 for complete list of data sources).

Only naturalized alien taxa are considered in the GloNAF database, defined as those that maintain self-sustaining populations independently of direct human intervention. The criteria for that definition follow Richardson et al. (2000, 2011), Pyšek et al. (2004) and Blackburn et al. (2011) and were applied as rigorously as data allowed. Taxa only known from cultivation and casuals (i.e. taxa found in the wild but not naturalized) were excluded whenever such information was provided. However, as some of the data sources did not provide clear definitions, it cannot be excluded that some of the alien species in some regions are not fully naturalized. For European countries whose floras distinguish two groups based on residence times, archaeophytes (alien species that arrived before the year 1492) and neophytes (species that arrived after the year 1492; Pyšek et al. 2004), only the latter were considered, because the archaeophyte status of some species is unclear, the classification is not available for all European regions, and it is not used in other regions of the world. Note, however, that a species can be an archaeophyte in one European country but a neophyte in another.

To standardize scientific names, each naturalized plant inventory was compared to The Plant List (2015), the most comprehensive working list of all plant species (Kalwij 2012). The taxonomic standardization was done using the R (R Core Team 2014) package Taxonstand (Cayuela & Oksanen 2014). In the analyses, we used the species names accepted by The Plant List, version 1.1 (as of 30 September 2013). Species not found in

The Plant List, even after accounting for spelling differences, were kept in the database using the names as used in the source data. In total, GloNAF 1.1 includes 13,168 taxa of which 13,033 are recognized by The Plant List (12,498 as accepted and 535 as unresolved names). The remaining 135 taxa do not occur in The Plant List, and among those 11 are ornamental cultivars (van Kleunen et al. 2015).

Invasive species numbers

To classify the species as invasive or not, we followed the definition used in environmental policy according to which invasive species exert negative impacts on the environment (CBD 2000, IUCN 2000). This definition differs somewhat from the one widely used in ecology that considers invasive species as the subset of naturalized alien species which spread rapidly from the point of introduction regardless of their impact (Richardson et al. 2000, 2011, Blackburn et al. 2011). The reason for this choice was partly pragmatic as some major databases listing invasive species follow the impact-based definition; using them made it possible to acquire data on the numbers of species that are categorized according to impact in a largely standardized manner and based on comparable criteria. Therefore, to avoid the influence of different interpretations of the term 'invasive' and to ensure a comprehensive and geographically balanced sampling, we based our consensus list of invasive alien plant species on three global data sources which provide standardized information on regions where alien plants are reported as invasive: (i) the CABI Invasive Species Compendium (http://www.cabi.org/isc), which contains 672 plant data sheets with information on invasiveness in national and subnational regions, (ii) the ISSG Global Invasive Species Database (http://www.iucngisd.org/gisd; Pagad et al. 2016), which contains information on invasiveness of 2530 plant species in countries and subnational administrative regions such as US states, and (iii) the database of 451 invasive plant species by Weber (2003, extended with unpublished data), which gives their distributions in 32 regions of the world. Alien plant species that were reported as invasive, corresponding to the above definition (CBD 2000, IUCN 2000) were extracted from these data sources, and their scientific names were standardized as above. Finally, total numbers of invasive alien plants were calculated per GloNAF region. This approach yielded data on invasive alien plant species distributions in 349 non-overlapping regions of the world.

Native species numbers

For each GloNAF region, we collected information on the number of native species in the flora, using a wide range of sources that are listed in Electronic Appendix 1. If archaeophytes were reported we excluded them from the lists of native species.

Species attributes

For each species in the GloNAF database, we extracted information on its native range. More specifically, we compiled data on which of the nine continents recognized by the Biodiversity Information Standards Organization (originally Taxonomic Databases Working Group) (TDWG continents; Brummit 2001) the species is native to, or whether the species is known only from cultivation or resulted from hybridization between two alien species, or between an alien and a native species. Most of the native-range data were extracted from the World Checklist of Selected Plant Families (WCSP 2014) supplemented with data from the Germplasm Resources Information Network (GRIN 2014). For the ~4000 species in GloNAF that were not included in these two major data sources, we retrieved information on native ranges from additional searches (see van Kleunen et al. 2015 for details). Information on the native range was found for all but 98 species, thus was available for 13,070 species (99.2%).

To explore the global patterns with respect to different life histories or growth forms (annual grass, annual forb, perennial grass, perennial forb, shrub, tree, aquatic plant, climber), we matched the GloNAF taxa with trait information from three different databases: the World Checklist of Selected Plant Families (WCSP 2014), the BONAP database (Kartesz 2015), and the European Garden Flora (Cullen et al. 2011). For taxa still lacking data information was obtained from various internet sources. Life-history information was found for 13,055 taxa (i.e. 99.1% of the total species covered by GloNAF).

Region environmental data

Each of the 844 regions considered in the present study (Appendix 1) was assigned to one of the nine continents (level 1) of the TDWG scheme: Europe, Africa, temperate Asia, tropical Asia, Australasia, Pacific island region, North America, South America and Antarctica (Brummit 2001), and to one of the following zonobiomes: I. Tropical (equatorial); II. Tropical (savanna); III. Subtropical (arid); IV. Mediterranean; V. Warm temperate; VI. Temperate (nemoral); VII. Arid temperate (continental); VIII. Cold temperate (boreal); IX. Arctic (based on Walter & Breckle 1991; see Fig. 1 for the global distribution of zonobiomes). For regions spanning over more than one zonobiome, the one indicated as dominant, in terms of prevailing area, has been chosen to represent the region. However, in some cases the region was assigned to the zonobiome that was most relevant for invasion; for example most of the territory of Algeria falls within the dry subtropics, due to the Sahara desert, but most alien plants are recorded from the mediterranean part, hence it was classified within the mediterranean zonobiome. Islands close to the mainland were assigned to the same zonobiome as the adjacent mainland, and distant islands were evaluated individually based on climate diagrams.

Each region was further classified as an island or mainland, whether located in the Old World (Europe, Asia, Africa) or New World (Australia, North America, South America, Pacific Islands), and its altitudinal range was recorded. For islands, distance to the nearest continental landmass, excluding Antarctica, was obtained from Weigelt & Kreft (2013). The area of regions included in the GloNAF 1.1 database, considering only the ice-sheet free areas of each region, ranges from 0.03 to 2,486,952 km^2, with a median of 20,918 km^2 (van Kleunen et al. 2015).

To evaluate the effect of socioeconomic variables that have been repeatedly shown to correlate with the levels of invasion (e.g. Pyšek et al. 2010, Essl et al. 2011, Seebens et al. 2015), we acquired data on per-capita gross domestic product (GDP; CIA 2013, Gennaioli et al. 2014, United Nations Statistics Division 2015).

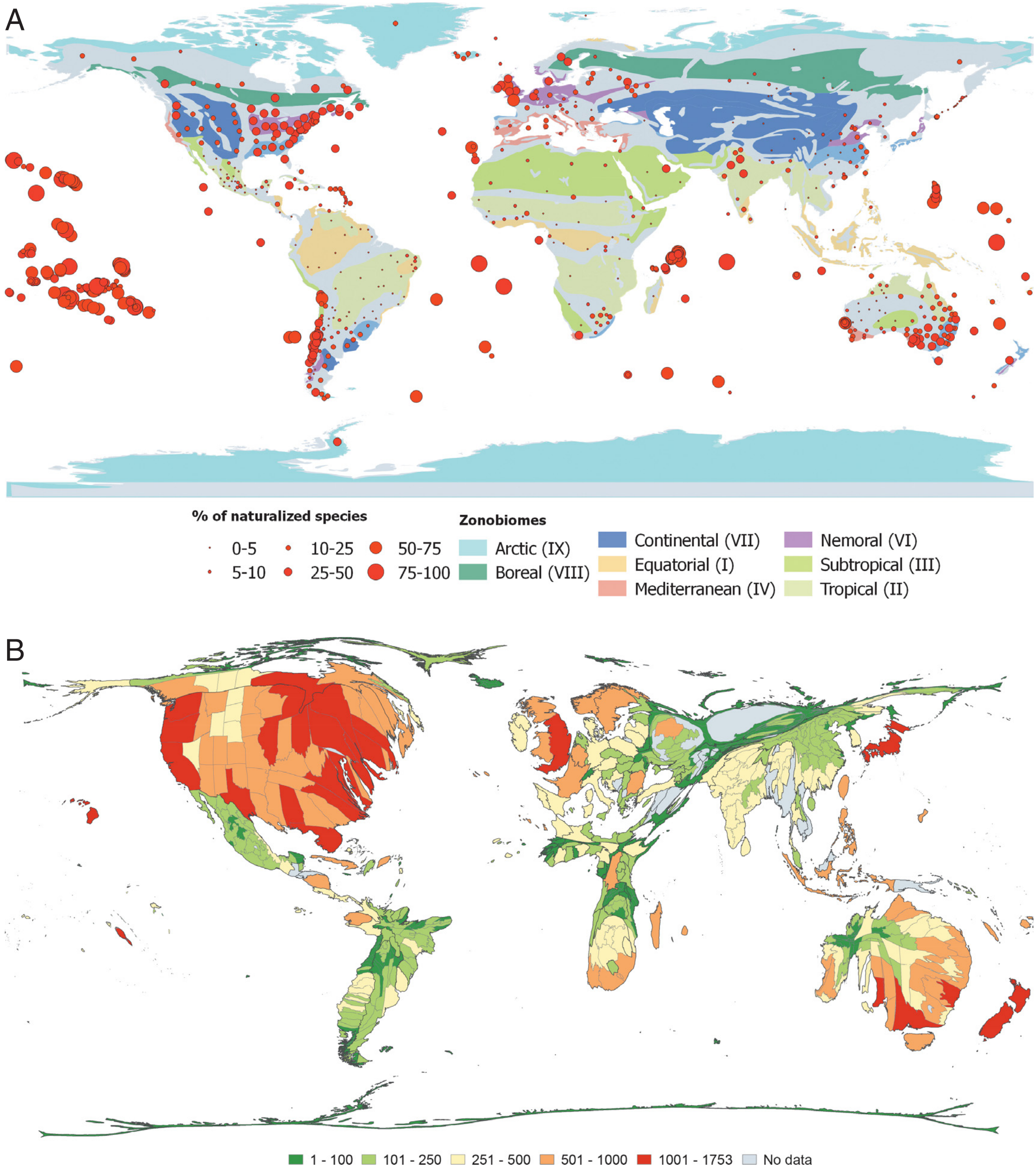


Fig. 1. – (A) Global map of the naturalization hotspots based on the percentage of naturalized species in regional floras covered by the GloNAF database shown by using red symbols. Distribution of the zonobiomes (based on Walter & Breckle 1991) is shown as a background (grey are the mountains and transitional zonobiomes). (B) Density equalizing cartogram created with the Cartogram Tool for ArcGIS using the algorithm developed by Gastner & Newman (2004). The shape of polygons is changed based on the absolute numbers of naturalized species in GloNAF regions. Size of the regions are modified to reflect how much the number of naturalized aliens deviates from expectations based on their areas, with those over-represented in aliens displayed larger and vice versa.

Statistical analysis

We tested for the effect of geographic and socioeconomic factors on the percentage of naturalized species in the total flora of individual regions (n = 844) using regression trees and random forests (Breiman et al. 1984, De'ath & Fabricius 2000). Random forests rank the importance of variables in a regression or classification problem, based on generating a large number of trees (Breiman 2001). The region-specific variables included in the models were zonobiome, Northern/Southern Hemisphere, Old vs. New World, area (in km^2; log-transformed), altitudinal range (in m), per capita GDP (in USD), and in case of islands also the distance to the nearest landmass (in km). We did not include primary climatic variables as the effect of climate was represented by zonobiomes.

Regression trees were constructed using binary recursive partitioning, with the default Gini index impurity measure used as the splitting index, in CART v. 7.0 (Breiman et al. 1984, Steinberg & Colla 1995). To find an optimal tree, a sequence of nested trees of decreasing size, each being the best of all trees of its size, was produced, and their resubstitution relative errors, corresponding to residual sums of squares, were estimated. Ten-fold cross-validation was used to obtain estimates of relative errors for these trees. Following De'ath & Fabricius (2000), the most likely (modal) single minimum cost tree was chosen for description from a series of 50 cross-validation runs.

Differences in the relationship between the numbers of native, naturalized and invasive species, and region area were tested by comparing slopes using ANCOVA and by deletion tests (Crawley 2007). To test whether the proportions within the categories of life history and origin were lower or higher than expected by chance, counts of species were compared with G-tests on contingency tables (e.g. Sokal & Rohlf 1995). To ascertain in which classes the counts appeared lower or higher than could be expected by chance, adjusted standardized residuals of G-tests were compared with critical values of the normal distribution following Řehák & Řeháková (1986).

To test whether the observed numbers of naturalized taxa per family were larger or smaller than expected, we compared the observed numbers with those based on random draws from the extant global flora. For the latter, we used a list of 337,130 plant taxa in which each of the 465 vascular plant families recognized by the Plant List was represented by the number of accepted taxa it has in the Plant List (version 1.1). We then randomly drew 12,498 taxa, which equals the number of taxa in GloNAF with accepted names in the Plant List, from the extant flora, and noted the number of taxa in each family. This was repeated 999 times. A family was considered to be significantly over-represented among the global naturalized flora if its observed number of naturalized taxa was within the top 2.5% quantile of the distribution of numbers for that family from the random draws. A family was considered as significantly under-represented if the observed number was within the lower 2.5% quantile of the distribution.

To test for a phylogenetic signal in the proportion of naturalized plant species per family (i.e. whether families with large proportions are evolutionary more closely related to each other), we first constructed a phylogenetic tree of all vascular plant families recognized by The Plant List (version 1.1; http://www.theplantlist.org). A topology of the phylogenetic tree of vascular plant families was built using Phylomatic version 3 (http://phylodiversity.net/phylomatic; Webb & Donoghue 2005). Branch lengths were calibrated based on known node ages using the function BLADJ – Branch Length

ADJustment – in the program Phylocom version 4.1 (Webb et al. 2008; for more details on the construction of the tree, see Electronic Appendix 2). As our data were proportions, they are not normally distributed, and might not follow the Brownian motion evolutionary model, which is an assumption of many phylogenetic signal statistics such as Blomberg's K. While the test statistic itself would be non-informative for our data, the randomization procedure to test significance of Blomberg's K and thus whether there is a phylogenetic signal or not should be robust (Enrico Rezende, personal communication). This randomization test makes no assumption about the evolutionary model that produced the data observed at the tips of the phylogeny. To be able to incorporate error (i.e. variance) in the proportions of naturalized species per family (Ives et al. 2007), we used the phylosig function in the phytools package (Revell 2012) of R (version 3.1.2; R Core Team 2014). As there are many families with few taxa, we followed the recommendation to add two successes and two failures in the calculation of the proportion of naturalized species per family, and used an arcsin-square-root transformation (Liam J. Revell; https://www.mail-archive.com/r-sig-phylo@r-project.org/msg02720.html). The variance of the arcsin-square root transformed proportion was calculated as 1/(4 × total number of species per family), as per Warton & Hui (2011). The number of randomizations for the significance test was set to 10,000.

Results

Global patterns of naturalized plant diversity and relationship with native richness

GloNAF 1.1 covers over 83% of the world's ice-free terrestrial surface in terms of regions for which complete naturalized floras are available (as in van Kleunen et al. 2015; Fig. 1 and Appendix 1). This figure markedly differs among individual TDWG continents, with near-complete data coverage being available in GloNAF for Australasia (99.5% coverage), Africa (98.6%), North America (95.9%), South America (95.8%) and Antarctica (90.2%). Coverage is lower for tropical Asia (68.5%) and temperate Asia (54.8%), where data are missing mostly for parts of Russia. The lack of data on naturalized floras for some regions of the European part of Russia also results in rather low coverage for Europe as a whole (63.8% of the continent area). Data on the composition of naturalized alien floras are available for about half of the total area of Pacific islands (49.1%).

The mainland regions with the highest numbers of naturalized aliens are some Australian states (with New South Wales being the richest in species) and several North American regions (of which California with 1753 naturalized plant species is the world's richest region; see van Kleunen et al. 2015). England, Japan, New Zealand and the Hawaiian archipelago are the islands or island groups with the greatest richness of naturalized plants (Appendix 1). Such ranking, however, only partly allows for comparison among regions because it does not take into account their widely differing areas – the number of naturalized species significantly increases with increasing area for mainland (slope $b = 0.45$) and even steeper so for island regions ($b = 0.66$; Fig. 2). At the continental level, North America and Australasia in particular harbour greater richness of naturalized plants than expected from their area (Fig. 1B).

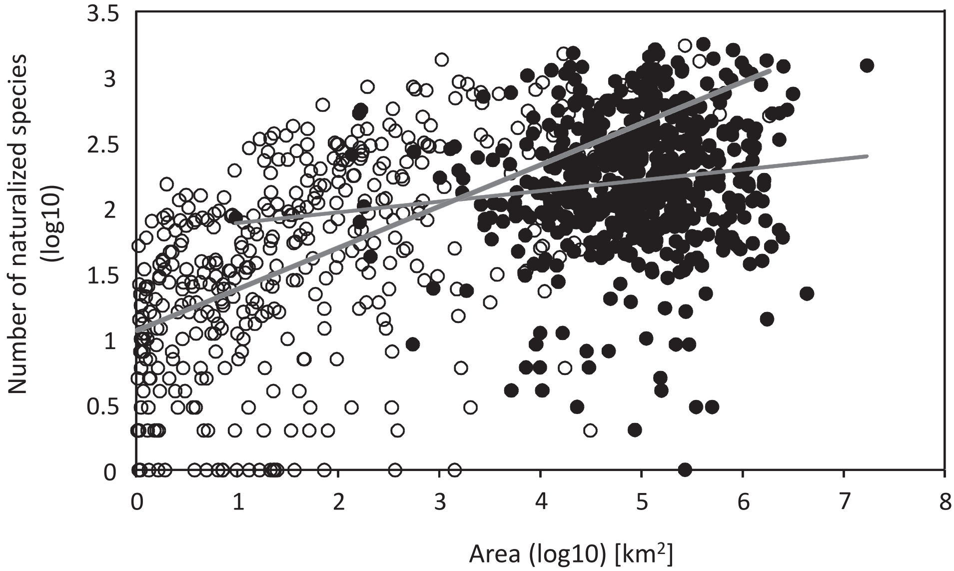


Fig. 2. – Species-area relationships of naturalized plant species for island (open circles, n = 361) and mainland regions (filled circles, n = 483). See Table 1 for the list of regions and data on naturalized species richness. The slope for islands (b = 0.66, S.E. = 0.026, $F_{1,360}$ = 656.8, P < 0.001) is significantly (ANCOVA, $F_{1,839}$ = 38.98, P < 0.001) steeper than for mainland (b = 0.45, S.E. = 0.005, $F_{1,480}$ = 7866, P < 0.001). Overall variation explained by the ANCOVA is R^2 = 0.646 for islands, and R^2 = 0.943 for mainland regions.

Nevertheless, the majority of the above-mentioned regions also form the main hotspots of naturalization, measured as the percentage of naturalized alien species in the total flora of the region (and therefore accounting for the differing areas of the regions). Such hotspots of relative naturalized species richness appear on both the western and eastern coasts of North America, in north-western Europe, South Africa, the south-eastern part of Australia, New Zealand, and several Indian states; very high levels of island invasions by naturalized plants are concentrated in the Pacific, but also occur on individual islands across all oceans (Fig. 1A, Appendix 1). Still, when interpreting the hotspot patterns in Fig. 1, it needs to be noted that the high levels of regional naturalizations are inferred from the species richness of entire floras and mapped as such for the whole countries or regions, not necessarily implying that they are valid for their whole territories. The resulting picture is therefore coarser than can be achieved by relating levels of invasion to the regional distribution of habitats (e.g. Chytrý et al. 2009a, b, 2012).

The data show a higher vulnerability of islands to plant invasions. While for mainland regions the distribution is strongly skewed, with 56% of all regions’ percentages of naturalized aliens not exceeding 10% and only 2% with over 40% naturalized aliens, for islands the distribution is more even across frequency classes; for 41% of the island regions, naturalized alien plants account for more than 40% of their floras. Moreover, the patterns are strikingly different among particular continents: some follow the strongly skewed global pattern (Europe, Asia, South America), while the two continental regions with the highest levels of naturalization (North America, Australasia) show a more even pattern, which is to some extent also true for Africa (Fig. 3).

The numbers of naturalized and native species in regions are significantly positively related to each other, with much stronger correlation for islands than for mainland regions ($R^2 = 0.50$ vs 0.23, respectively). Furthermore, the number of naturalized species on islands increases significantly faster with increasing native species richness than for mainland regions (Fig. 4). In mainland regions, there is a rather steep increase in the number of naturalized species with the number of native species for regions harbouring up to ~1000 native species; after this threshold the regions that are richer in native species can harbour both very high and very low numbers of naturalized aliens (Fig. 4A). The increase on islands is steadier across the whole range of native species richness values (Fig. 4B).

Patterns in invasive species

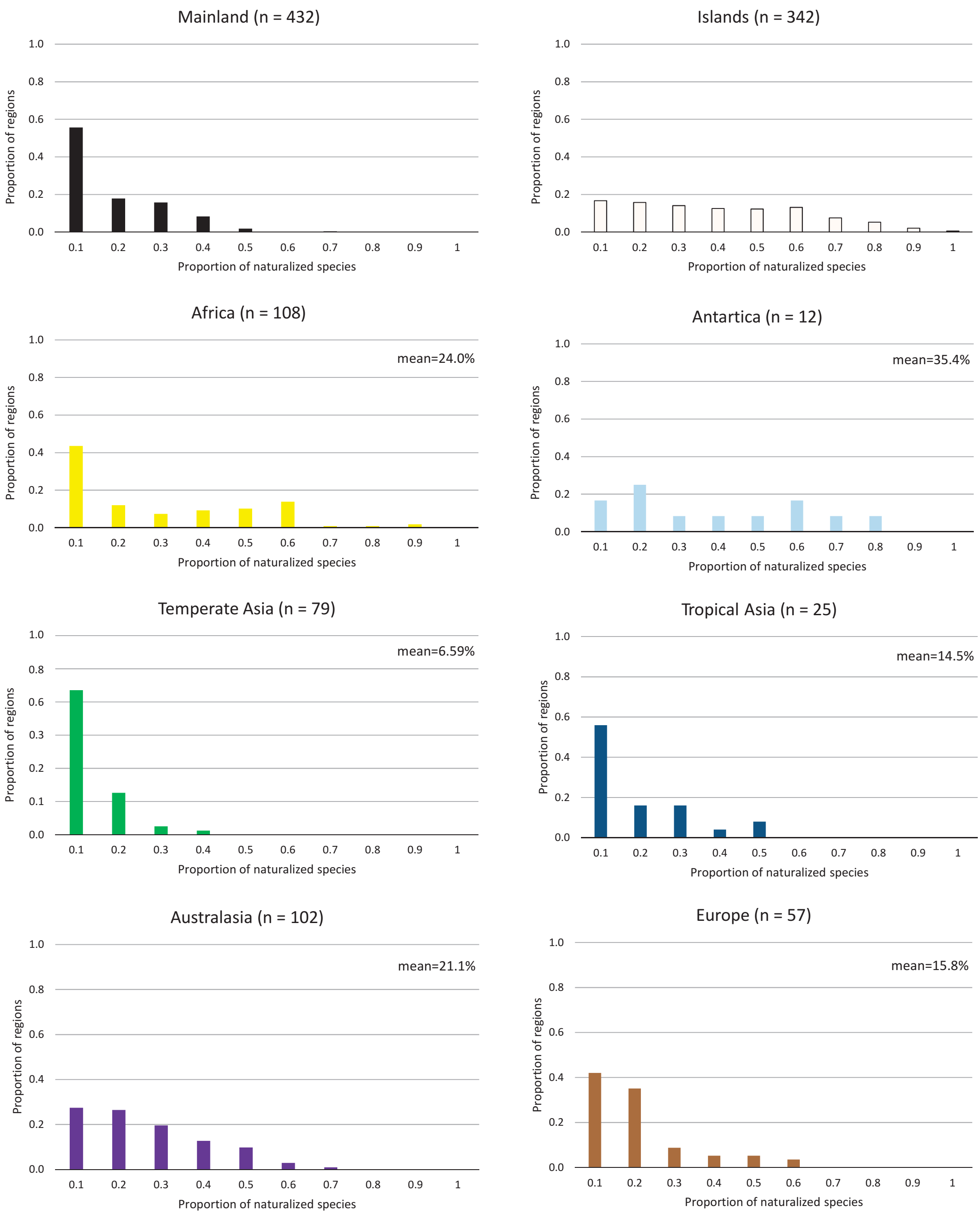
South Africa, India, California, Cuba, Florida, Queensland and Japan are regions with the highest numbers of reported invasive species. As there is a strong correlation ($R^2 = 0.44$ and 0.45, respectively, Fig. 4C, D) between the numbers of invasive and all naturalized species (the latter group includes the former species as a subset), the patterns in invasive species hotspots correspond to those described above for the naturalized species. The increase in the number of invasive species with that of naturalized species is significantly faster for mainland than island regions; interestingly, in mainland regions, it corresponds more closely to the rate of increase predicted by the Tens Rule (Williamson & Fitter 1996; Fig. 4C). Appendix 1 gives the number of invasive species per region where this information is available (n = 349 non-overlapping regions).

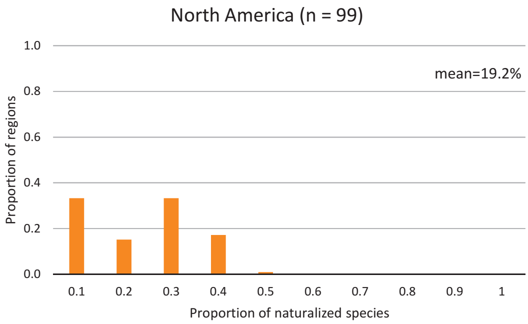
Geographical structure of naturalized species richness: continents, zonobiomes and insularity

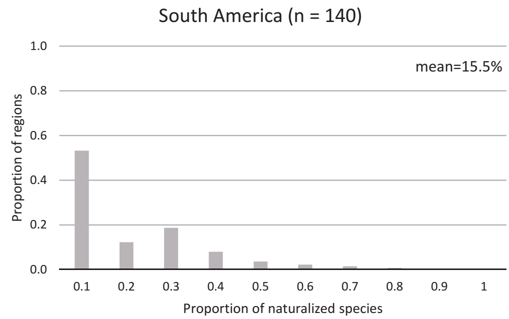
North America (5958 taxa), Europe (4139), and Australasia (3886) are richest in absolute total naturalized species numbers as recorded on TDWG continents (reported in van Kleunen et al. 2015). All other continents, except Antarctica, harbour naturalized species numbers ranging between ~2000–3500 (Table 1).

Among the zonobiomes, areas in the temperate nemoral zone are richest in naturalized species (6586), followed by tropical (equatorial and savanna), and warm temperate zonobiomes, with > 4600 species each (Table 1). Together all temperate zonobiomes harbour 9036 naturalized species compared to 6774 for tropical ones, followed by 3280 species naturalized in the mediterranean zonobiomes, 3057 in subtropical zonobiomes and 321 in the Arctic. If the total numbers of naturalized species are related to the area covered by each zonobiome, by comparing the rate of species accumulation with area, a general trend appears to be that the accumulation is rather fast in colder temperate and mediterranean regions and slow in arid zonobiomes (Table 2).

In summary, GloNAF 1.1 records a total of 12,345 naturalized alien taxa in mainland regions, and 8019 in island regions. The New World is richer in naturalized alien plants, with 9905 taxa compared to 7923 recorded in the Old World, which covers a larger area in our data set (61,490,000 km^2 vs 46,960,000 km^2 for the New World). The difference is marginally significant if the rate of naturalized species accumulation with area is used as a measure (slope z of the species-area relationship for the New World = 0.23±0.01, for the Old World = 0.19±0.02; F = 3.06; df = 1, 839; P = 0.08).


Mainland (n = 432)
Islands (n = 342)
Africa (n = 108)
mean=24.0%
Antartica (n = 12)
mean=35.4%
Temperate Asia (n = 79)
mean=6.59%
Tropical Asia (n = 25)
mean=14.5%
Australasia (n = 102)
mean=21.1%
Europe (n = 57)
mean=15.8%
Proportion of regions
Proportion of naturalized species
0.0
0.2
0.4
0.6
0.8
1.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1





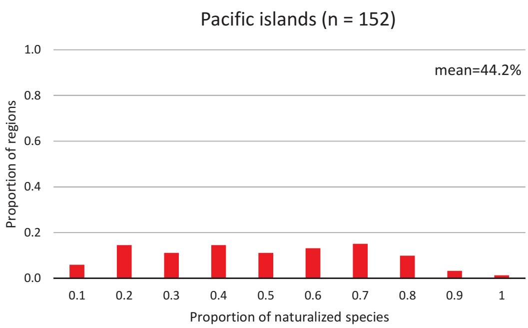
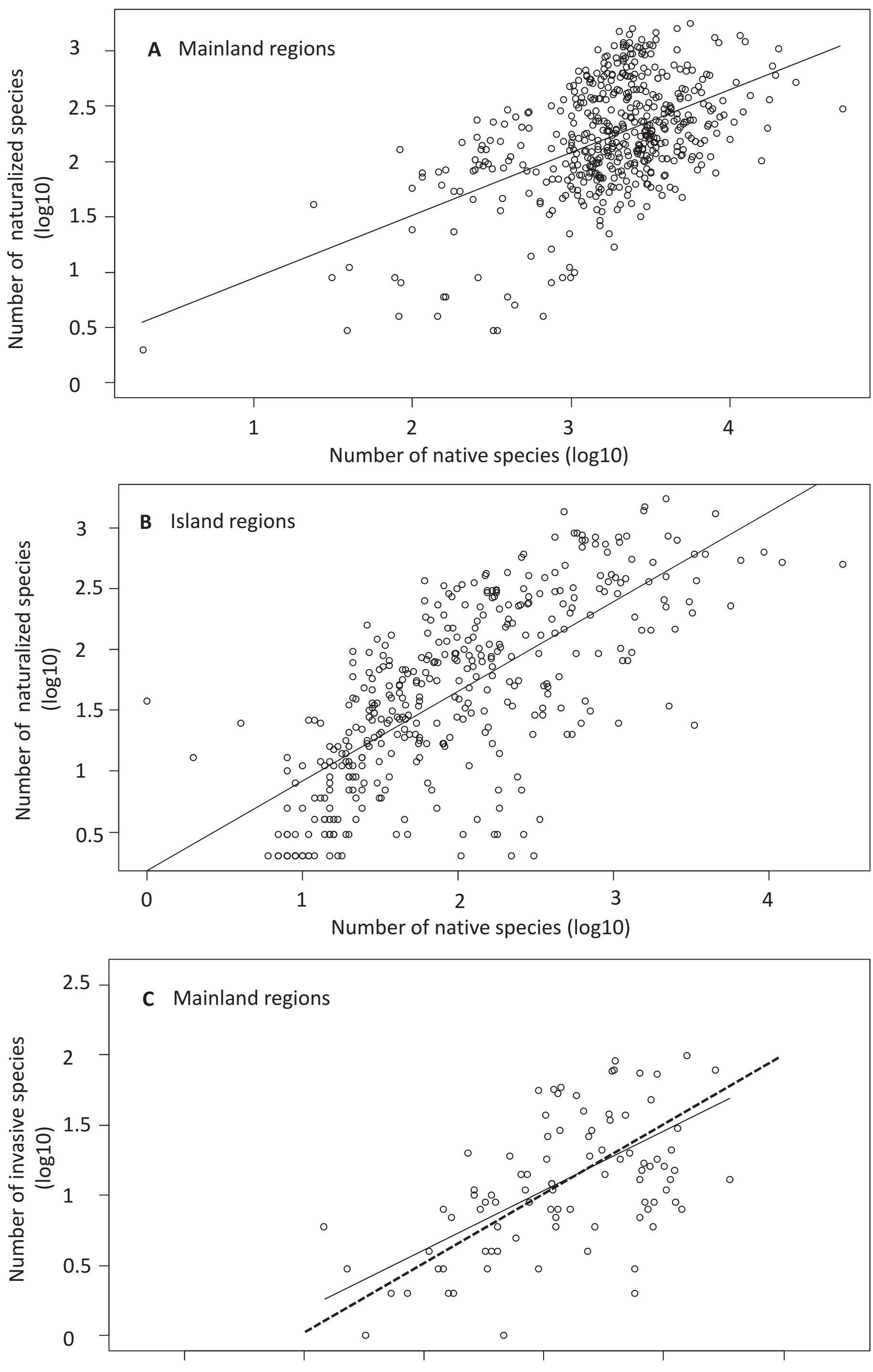


Fig. 3. – Frequency distributions of the proportions of naturalized species in total regional floras, shown for pooled data for (A) mainland regions, and (B) islands. The frequency distributions for mainland and island regions are significantly different (Kolmogorov-Smirnov test, $D = 0.47$, $P < 0.001$). Lower panels display frequency distributions separately for the nine TDWG continents. Note that the sum of regions is lower than the total of 844 analysed in the paper since the data on native species numbers are not available for all regions.

Factors determining the levels of naturalization in floras of the world

The factors determining the percentage of naturalized species in floras as revealed by regression-tree analyses markedly differ between mainland and island regions. The best regression tree for the mainland regions (Fig. 5A) had six nodes ($R^2 = 0.51$). For mainland regions, the main split was among zonobiomes, with regions located mainly in colder temperate and mediterranean climates harbouring on average twice as many naturalized aliens (19%) as those located in arid temperate, subtropical and tropical climates (10%). The level of naturalization in the former group of zonobiomes, colder temperate and mediterranean, was further differentiated by whether the region is located in the Old World, where the values are on average 10%, or in the New World, where the average level of naturalization was as high as 25%. Finally, the patterns are fine-tuned by per-capita GDP. Regions in arid temperate, subtropical and tropical climates with a higher per-capita GDP, the threshold being ~17,000 USD per capita, harbour on average more than twice the percentage of naturalized alien plants in their floras (16%) than regions below this GDP value (6%). Interestingly, 33 regions in our dataset with per capita GDP >54,000 USD exhibited rather low levels of naturalization (represented by a number of Australian regions, Liechtenstein and Luxembourg in Europe, Campeche in Mexico, and Washington D.C. in the USA), and appear in both parts of the regression tree separated by zonobiomes. This seems to suggest that there is an optimum range of GDP


A Mainland regions
Number of naturalized species (log10)
Number of native species (log10)
B Island regions
Number of naturalized species (log10)
Number of native species (log10)
C Mainland regions
Number of invasive species (log10)
Number of naturalized species (log10)

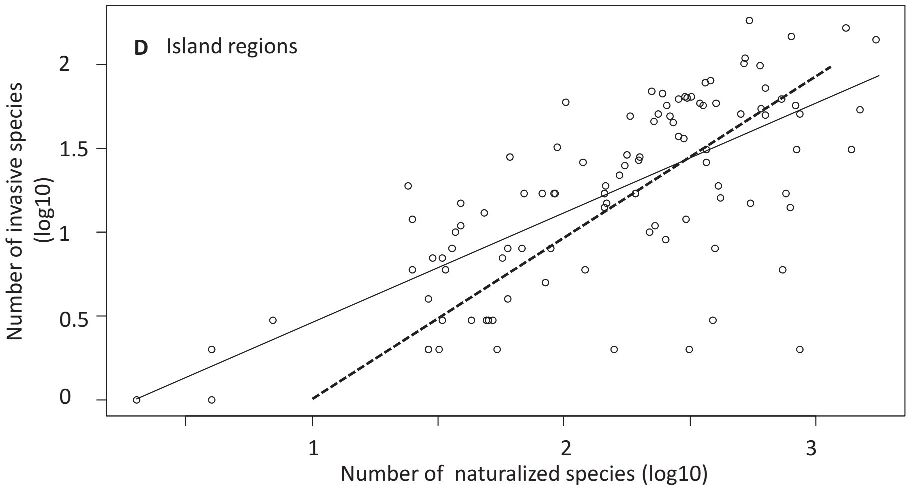


Fig. 4. – Relationships between the numbers of naturalized and native species shown for (A) mainland regions, and (B) island regions, and the relationship between invasive and naturalized alien species in (C) mainland and (D) island regions. The number of naturalized species on islands increased with the number of native species at a higher rate than in mainland regions ($P < 0.001$, $t = 3.75$; differences in slopes tested by analysis of covariance on $\log_{10}+1$ transformed species numbers), but the increase in the number of invasive species with that of naturalized species was significantly faster for mainland than for island regions ($P < 0.05$, $t = 2.5$). All slopes were significantly different from zero: (A) Naturalized = $0.60 + 0.51 \cdot \log_{10}$(Native); $R^2 = 0.23$, $F = 141.8$, df = 1,429, $P < 0.001$; (B) Naturalized = $0.18 + 0.73 \cdot \log_{10}$(Native)); $R^2 = 0.50$, $F = 346.2$, df = 1, 340, $P < 0.001$; (C) Invasive = $-0.65 + 0.83 \cdot \log_{10}$(Naturalized); $R^2 = 0.45$, $F = 217.5$, df = 1, 263, $P < 0.001$; (D) Invasive = $-0.12 + 0.61 \cdot \cdot \log_{10}$(Naturalized)); $R^2 = 0.44$, $F = 63.9$, df = 1, 81, $P < 0.001$. The dashed line indicates the rate of increase in invasive species with that of naturalized as predicted by the Tens Rule (Williamson & Fitter 1996). The 95% confidence interval for the slope of the relationship for mainland regions is 0.72 – 0.94, and for islands 0.46 – 0.76, both are significantly different from the Tens Rule prediction at $P < 0.05$ and $P < 0.01$, respectively. Note the log scale.

where the levels of naturalization are the highest (27% of naturalized alien plants in floras of temperate and mediterranean climates of the New World, and 18% in the other zonobiomes) (Fig. 5A).

Besides zonobiome, per-capita GDP and location in the Old or New World, there were several other variables that did not appear in the regression tree but contributed to the structuring of the level of invasion in mainland regions. The ranking of variables according to their relative importance using random forests ($R^2 = 0.59$; with per-capita GDP set to 100%) revealed that besides zonobiome (83.7%) and whether the region is in the Old or New World (26.4%) also log area (48.0%), hemisphere (16.6%), mean altitude (13.6%) and altitudinal range (6.6%) appeared among the significant explanatory factors.

The best regression tree for islands ($R^2 = 0.33$) had six nodes. Remote islands, separated by more than 1230 km from the nearest continental landmass, are markedly more invaded than those located closer to the mainland (on average 43% vs 24% of the floras consist of naturalized aliens, respectively). The level of naturalization on these more isolated islands is further enhanced if their altitude is > 7 m a.s.l., and a very high average level of naturalization (55%) is found for 54 islands that are more than ~4100 km away from the mainland; those among them that are > 2 km^2 harbour the highest percentage of naturalized aliens in their flora of the whole data set (61%). Floras of less remote islands

Table 1. – Total numbers of naturalized alien taxa recorded in mainland and island regions, in particular TDWG continents, and in zonobiomes of the globe (based on Walter & Breckle 1991). Note that only Pacific islands are classified as a separate TDWG continent, islands in other oceans are assigned to the nearest continents. Numbers for TDWG continents are taken from van Kleunen et al. (2015).

Insularity	Mainland 12,345	Island 8019							
Continent	Europe	Africa	Asia (temperate)	Asia (tropical)	Australasia	Pacific	North America	South America	Antarctica
Species no.	4139	3563	2416	2138	3886	2935	5958	3117	159
Zonobiomes	I. Tropical (equatorial)	II. Tropical (savanna)	III. Subtropical (arid)	IV. Mediterranean	V. Warm temperate	VI. Temperate (nemoral)	VII. Arid temperate (continental)	VIII. Cold temperate (boreal)	IX. Arctic
Species no.	4690	4843	3057	3280	4649	6586	1425	2739	321

Table 2. – The rate of increase in numbers of naturalized taxa with area for zonobiomes. Slopes z (from equation species no. = $c \cdot Area^z$) are given with standard errors (S.E.) and results of multiple comparisons are shown for each slope; those bearing the same letters are not significantly different. Zonobiomes are ranked according to the decreasing value of the slope.

Zonobiome	Slope	S.E.	Multiple comparisons
VIII. Cold temperate (boreal)	0.358	0.035	a
VI. Temperate (nemoral)	0.269	0.066	b
IV. Mediterranean	0.243	0.043	b
IX. Arctic	0.212	0.104	ab
I. Tropical (equatorial)	0.189	0.038	b
II. Tropical (savanna)	0.186	0.043	b
V. Warm temperate	0.179	0.062	b
VII. Arid temperate (continental)	0.104	0.159	abc
III. Subtropical (arid)	0.046	0.078	c

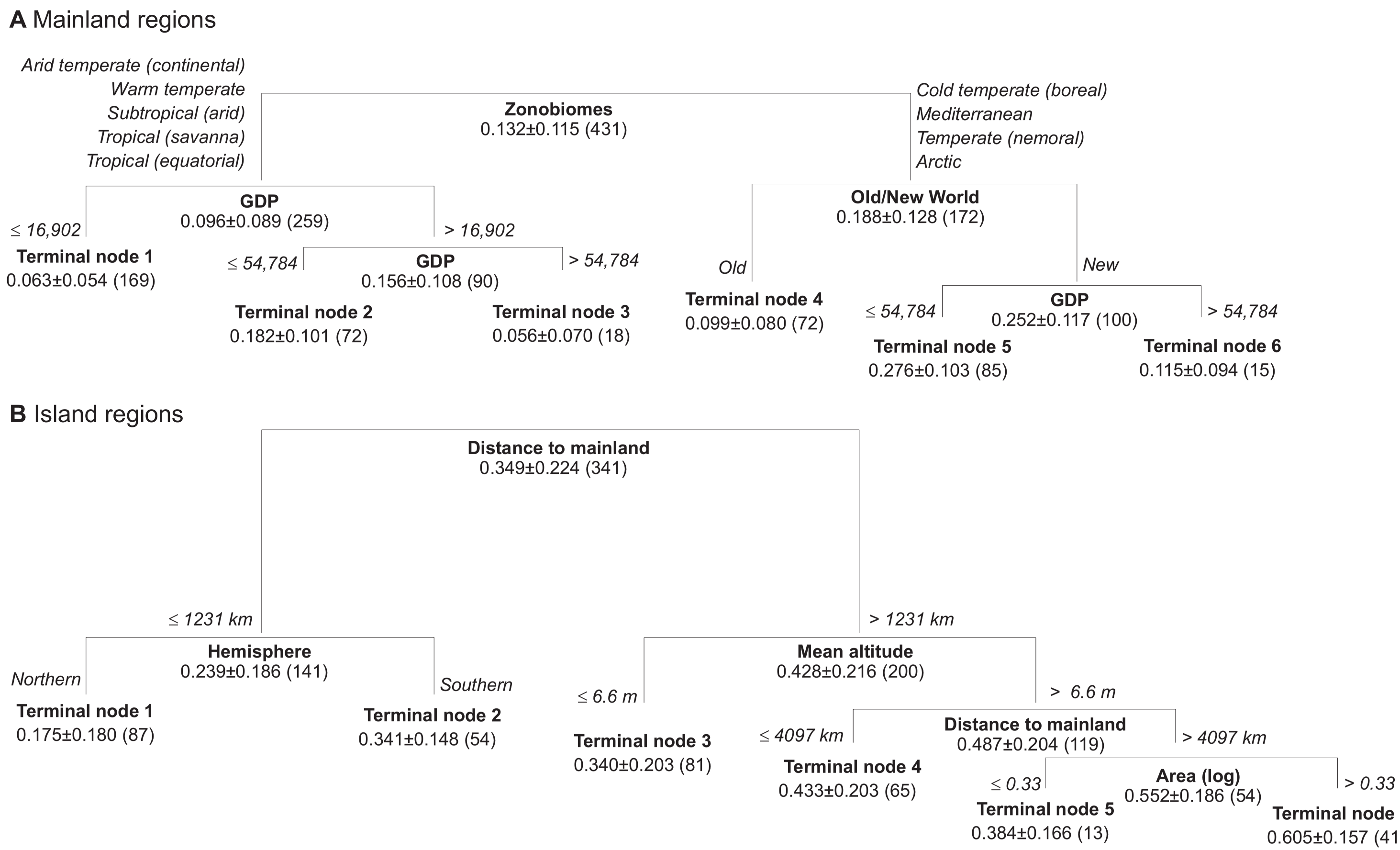


Fig. 5. – Best regression trees describing which factors determine the proportion of naturalized alien species in (A) mainland and (B) island regions (expressed as the percentage of the total flora). Each node of the tree is described by the splitting variable and its split value, mean ± standard deviation of the percentage of naturalized species, and the number of regions in that node in brackets. The vertical depth of each node is proportional to its improvement value that corresponds to the explained variance at that node.

(< 1230 km from the nearest continental landmass) in the Southern Hemisphere (harbouring on average 34% of naturalized species) are more invaded than less remote islands in the Northern Hemisphere (18%), which are the least invaded in the whole data set (Fig. 5B).

The ranking of variables according to their importance as explanatory variables, using random forests ($R^2 = 0.43$; with distance from mainland set to 100%) was zonobiome (31.8%), per-capita GDP (27.3%), log area (15.3%), middle altitude (13.6%), hemisphere (11.3%), Old vs New World (7.2%) and the range of altitudes (2.9%).

Taxonomic composition of global naturalized alien flora

Overall, the frequency distribution of the number of regions per species is strongly skewed, indicating that the vast majority of naturalized aliens have restricted distributions in terms of their naturalized ranges, and only a few are widely distributed across the globe (Fig. 6A). The two measures of naturalized species occurrences, the number of regions and their total area, are closely correlated (Fig. 6B).

The 200 most widely distributed (i.e. the top 1.5%) naturalized alien species are listed in Table 3, with their frequency of occurrence classified by continents, biomes and insularity. In terms of the latter factor, while the majority of these widespread naturalized aliens occur with similar frequency both in mainland and island regions, some exhibit a strong affinity to one of the region types. For example, among the 21 species that are recorded as naturalized in more than 40% of mainland regions, some have markedly restricted distributions on islands, with those from which they are known as naturalized not exceeding 10% of the total number of islands: *Polygonum aviculare* (present on 42.8% of mainland regions and on 7.5% of all islands sampled; n = 483 and 361, respectively), *Digitaria sanguinalis* (43.9% vs 7.7%), *Sonchus asper* (45.3% vs 9.1%), *Lolium perenne* (40.7% vs 9.1%), *Echinochloa crus-galli* (49.3% vs 9.7%), *Sorghum halepense* (41.8% vs 9.7%), *Capsella bursa-pastoris* (54.1% vs 9.9%). In contrast, species with the strongest affinity for islands are *Phyllanthus amarus* (found on 35.1% of islands, but only on 7.1% of the mainland regions sampled), *Carica papaya* (33.4% vs 13.1%), *Cyanthillium cinereum* (31.5% vs 12.1%), *Euphorbia hirta* (39.2% vs 24.1%), *Catharanthus roseus* (33.1% vs 18.7%), *Mangifera indica* (24.9% vs 11.0%), *Bryophyllum pinnatum* (24.0% vs 11.6%), *Casuarina equisetifolia* (24.9% vs 12.5%), *Cenchrus echinatus* (26.5% vs 14.8%) and *Psidium guajava* (26.0% vs 14.8%).

The 11 most widely distributed species each occur on about one third of the globe or more in terms of the number of regions where they are naturalized and at least 35% of the Earth's land surface in terms of those regions' areas (Table 3). The most widely distributed species, *Sonchus oleraceus* occurs in 48% of the regions, which together cover 42% of the Earth's land surface. Other widely distributed species are *Ricinus communis*, *Oxalis corniculata*, *Portulaca oleracea*, *Eleusine indica*, *Chenopodium album*, *Capsella bursa-pastoris*, *Stellaria media*, *Bidens pilosa*, *Datura stramonium* and *Echinochloa crus-galli*. Interestingly, these 11 top species are representatives of nine families (with only *Compositae* and *Poaceae* listed more than once), and include annual and perennial herbs and grasses, as well as a shrub and a tree (Table 3).

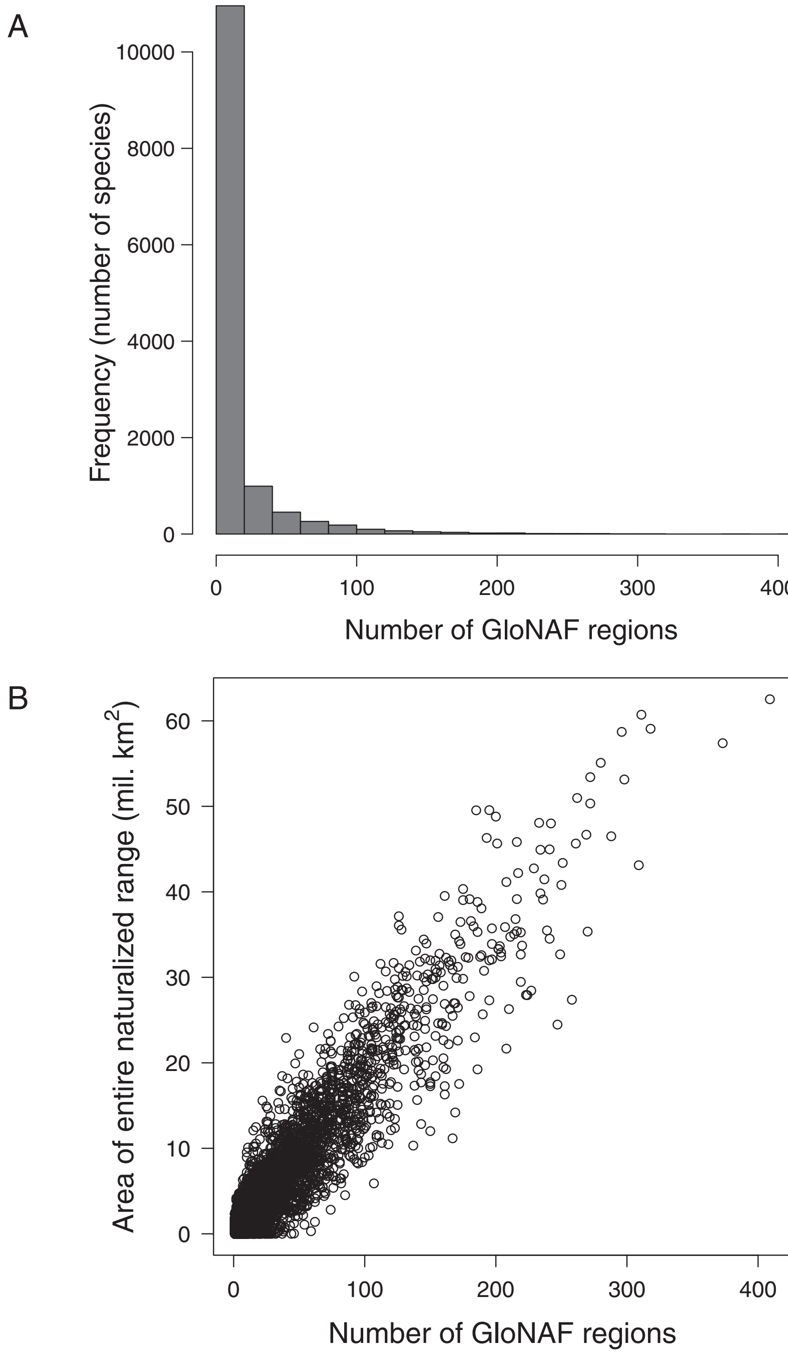


Fig. 6. – Range sizes of naturalized taxa on mainland regions. (A) Histogram of the number of GloNAF regions per taxon, and (B) the association between number of GloNAF regions and cumulative area of these regions per taxon (Spearman rho = 0.770, P < 0.001).

Table 3. – Overview of the 200 most widely distributed naturalized plant taxa, as recorded in 844 global regions (Regs total). Species are ranked according to decreasing number of regions, and are all those that occur in at least 125 regions (14.8% of the total). For each species, the total area of the regions in which it is recorded, number of mainland (Main reg, n = 483) and island regions (Isl reg, n = 361), and numbers of regions on TDWG continents (Eur – Europe, n = 62; Afr – Africa, n = 136; As-tm – Asia temperate, n = 80; As-tr – Asia tropical, n = 44; Aus – Australasia, n = 102; Pac – Pacific Islands, n = 152; NAm – North America, n = 99; SAm – South America, n = 156; Ant – Antarctica, n = 12), and in the particular zonobiomes, are also given. LH (life history): ag – annual grass, bg - biennial grass, ph – perennial grass, ah – annual herb, bh – biennial herb, ph – perennial herb, s – shrub, t – tree. Family names are abbreviated by the first four letters. Continents of native distribution are the same TDWG continents used to display naturalized distributions; cult – origin unknown or originated in cultivation. Author names are according to The Plant List (2015).

Taxon	Family	LH	Continent of native distribution	Regs total	Area total (km^2)	Main reg	Isl reg	Number of regions invaded on continents									Number of regions by zonobiomes				
								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Sonchus oleraceus (L.) L.	Comp	ah	Eur Afr As-tm As-tr	409	62 527 773	298	111	4	42	29	38	89	41	94	68	4	195	59	43	110	2
Ricinus communis L.	Euph	ah ph s t	Afr	373	57 390 161	259	114	13	81	38	39	48	45	59	50	0	219	47	29	78	0
Oxalis corniculata L.	Oxal	ah ph	cult	318	59 078 687	237	81	23	61	27	35	32	33	59	44	4	167	17	13	120	1
Portulaca oleracea L.	Port	ah	NAm Eur	311	60 721 886	215	96	15	56	37	37	20	66	61	19	0	168	17	18	108	0
Eleusine indica (L.) Gaertn.	Poac	ag pg	Afr As-tm As-tr	309	43 115 559	197	112	19	9	21	4	38	73	75	69	1	182	27	14	86	0
Chenopodium album L.	Amar	ah	Eur Afr As-tm NAm	298	53 142 110	260	38	11	28	52	14	49	3	85	55	1	84	42	38	133	1
Capsella bursa-pastoris (L.) Medik.	Bras	ah	Eur Afr As-tm As-tr	296	58 712 668	260	36	8	19	38	34	48	5	83	60	1	103	38	20	130	5
Stellaria media (L.) Vill.	Cary	ah ph	Eur Afr As-tm As-tr	288	46 501 955	233	55	4	26	39	15	49	10	83	58	4	99	32	22	129	6
Bidens pilosa L.	Comp	ah	NAm SAm	280	55 094 275	179	101	6	83	26	14	35	64	25	27	0	186	26	9	59	0
Datura stramonium L.	Sola	ah	NAm	272	53 418 029	218	54	32	39	41	13	37	6	56	48	0	92	25	31	124	0
Echinochloa crus-galli (L.) P. Beauv.	Poac	ag	Eur Afr As-tm As-tr	272	50 337 063	237	35	13	6	45	33	48	8	86	33	0	104	32	12	124	0
Amaranthus viridis L.	Amar	ah	Pac	270	35 350 032	174	96	15	27	32	34	44	56	24	38	0	167	23	22	58	0
Poa annua L.	Poac	ag bg	Eur	269	46 685 500	219	50	4	26	33	14	47	9	90	37	9	84	35	22	121	7
Brassica rapa L.	Bras	ah bh	cult	262	50 978 397	204	58	17	19	38	1	31	26	65	64	1	83	20	29	128	2
Plantago major L.	Plan	ph	Eur	261	45 650 472	198	63	4	21	20	4	28	19	94	68	3	114	26	15	104	2
Euphorbia hirta L.	Euph	ah	NAm SAm	258	27 378 484	116	142	0	74	13	39	28	91	8	5	0	220	17	4	17	0
Sonchus asper (L.) Hill	Comp	ah	Eur Afr As-tm As-tr	251	43 384 573	218	33	5	22	20	34	31	3	84	51	1	97	34	17	101	2
Mirabilis jalapa L.	Nyct	ph s	SAm	250	40 804 678	166	84	9	46	35	35	20	42	30	33	0	155	8	16	71	0

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								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Chenopodium murale L.	Amar	ah	Eur Afr As-tm	249	32 688 690	187	62	5	25	2	7	68	13	73	55	1	94	58	34	63	0
Cynodon dactylon (L.) Pers.	Poac	bg pg	Afr As-tm As-tr	247	24 474 963	154	93	11	4	0	3	39	62	75	52	1	134	42	14	57	0
Medicago sativa L.	Legu	ah ph	Eur Afr As-tm As-tr	242	48 004 914	205	37	31	15	18	7	46	9	63	51	2	49	35	37	119	2
Digitaria ciliaris (Retz.) Koeler	Poac	ag pg	Afr As-tr NAm SAm	241	34 514 805	179	62	7	5	25	32	48	41	56	27	0	135	32	11	63	0
Rumex crispus L.	Poly	ph	Eur Afr As-tm As-tr	241	44 966 947	204	37	0	13	24	9	45	6	90	51	3	73	38	19	109	2
Digitaria sanguinalis (L.) Scop.	Poac	ag	Eur Afr As-tm As-tr	239	35 488 828	211	28	12	16	17	33	38	1	83	38	1	93	36	15	95	0
Plantago lanceolata L.	Plan	ah bh ph	Eur Afr As-tm As-tr	237	41 463 327	192	45	2	18	19	5	37	15	77	61	3	72	34	25	102	4
Sorghum halepense (L.) Pers.	Poac	bg pg	Afr As-tm As-tr	236	39 098 637	201	35	21	22	9	9	35	11	79	50	0	97	36	23	80	0
Erigeron canadensis L.	Comp	ah	NAm SAm	234	44 925 087	193	41	47	21	52	9	26	8	63	8	0	65	5	18	146	0
Solanum americanum Mill.	Sola	ah ph s	Eur Afr As-tm As-tr NAm SAm	234	39 822 876	158	76	6	58	12	38	73	19	24	2	2	134	32	23	45	0
Polygonum aviculare L.	Poly	ah ph	Eur As-tm	233	48 078 620	206	27	2	13	34	2	44	2	68	67	1	52	33	28	116	4
Lolium perenne L.	Poac	ag bg pg	Eur Afr As-tm As-tr	229	42 746 870	196	33	12	13	43	3	43	3	66	43	3	46	22	20	137	4
Erigeron bonariensis L.	Comp	ah	SAm	227	28 443 027	160	67	16	38	26	12	60	31	20	23	1	102	33	39	53	0
Echinochloa colona (L.) Link	Poac	ag	Afr As-tm As-tr	224	27 915 059	153	71	10	1	2	34	28	41	58	50	0	142	32	17	33	0
Euphorbia prostrata Aiton	Euph	ah	NaM SAm	223	27 938 785	107	116	11	61	10	28	17	73	22	1	0	169	8	11	35	0
Arundo donax L.	Poac	bg pg	As-tm As-tr	220	33 707 662	173	47	7	26	12	33	33	15	46	48	0	126	33	17	44	0
Erodium cicutarium (L.) L'Hér.	Gera	ah bh	Eur Afr As-tm As-tr	219	32 666 596	186	33	1	6	4	4	56	6	85	57	0	44	54	39	80	2
Medicago polymorpha L.	Legu	ah ph	Eur Afr As-tm	219	35 261 282	186	33	3	18	8	12	63	10	59	46	0	80	45	31	63	0
Melilotus indicus (L.) All.	Legu	ah	Eur Afr As-tm As-tr SAm	219	29 468 034	184	35	9	13	17	33	56	5	35	51	0	74	37	34	72	2
Nasturtium officinale R. Br.	Bras	ph	Eur Afr As-tm As-tr	217	42 197 885	174	43	1	19	20	34	31	11	60	40	1	108	16	7	86	0
Galinsoga parviflora Cav.	Comp	ah	NAm SAm	216	45 833 946	179	37	43	35	17	37	24	8	44	8	0	87	11	17	101	0

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								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Lepidium didymum L.	Bras	ah	SAm	216	35 396 181	162	54	22	27	15	33	46	14	52	6	1	93	24	24	75	0
Taraxacum campylodes G. E. Haglund	Comp	ph	Eur Afr As-tm As-tr	216	39 150 503	176	40	1	11	9	4	36	12	91	49	3	73	36	16	85	6
Physalis angulata L.	Sola	ah	NAm SAm	215	36 813 881	151	64	2	49	19	37	28	46	8	26	0	162	19	6	28	0
Leucaena leucocephala (Lam.) de Wit	Legu	s t	NAm SAm	214	35 052 437	109	105	1	47	13	41	17	55	3	37	0	187	10	4	13	0
Trifolium repens L.	Legu	ph	Eur Afr As-tm As-tr	211	34 744 275	172	39	2	8	25	12	29	4	81	46	4	60	18	18	110	5
Catharanthus roseus (L.) G. Don	Apoc	ph s	Afr	210	26 284 568	90	120	0	76	14	11	16	59	12	22	0	175	9	4	22	0
Avena fatua L.	Poac	ag	Eur Afr As-tm As-tr	208	41 150 737	176	32	11	5	25	4	55	5	75	28	0	47	35	23	102	1
Cyperus rotundus L.	Cype	ph	Eur Afr As-tm As-tr Pac	208	21 660 549	138	70	2	3	17	34	36	43	51	22	0	134	24	6	44	0
Senna occidentalis (L.) Link	Legu	ah ph s	NAm SAm	207	35 880 346	135	72	0	77	12	39	21	35	22	1	0	158	17	1	31	0
Melia azedarach L.	Meli	s t	As-tm As-tr Aus Pac	204	32 456 740	140	64	5	51	2	34	6	36	45	25	0	152	20	12	20	0
Raphanus raphanistrum L.	Bras	ah bh	Eur Afr As-tm	204	32 896 470	168	36	7	9	6	31	52	6	61	30	2	70	22	29	81	2
Dactylis glomerata L.	Poac	pg	Eur Afr As-tm As-tr	203	33 645 949	163	40	10	7	24	8	32	6	74	38	4	49	17	16	112	9
Dysphania ambrosioides (L.) Mosyakin et Clemants	Amar	ah s	NAm SAm	202	33 291 768	148	54	21	51	5	10	33	8	48	26	0	105	17	17	63	0
Eichhornia crassipes (Mart.) Solms	Pont	ph	SAm	202	33 317 985	154	48	6	24	20	37	21	17	57	20	0	124	20	10	48	0
Amaranthus hybridus L.	Amar	ah	NAm SAm	201	45 653 764	177	24	23	39	16	4	26	4	54	35	0	57	22	33	89	0
Amaranthus spinosus L.	Amar	ah	NAm SAm	200	48 801 327	168	32	4	48	21	39	11	16	39	22	0	122	11	3	64	0
Ageratum conyzoides (L.) L.	Comp	ah ph	SAm	197	32 095 010	121	76	0	62	10	39	16	54	11	5	0	166	9	1	21	0
Foeniculum vulgare Mill.	Apia	bh ph	Eur Afr As-tm As-tr	197	35 726 578	164	33	12	11	36	3	23	10	57	45	0	58	25	17	97	0
Lantana camara L.	Verb	s	NAm SAm	197	33 899 768	122	75	5	64	9	39	21	40	13	6	0	154	13	12	18	0

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								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Anagallis arvensis L.	Prim	ah bh	Eur Afr As-tm As-tr	195	27 313 849	154	41	3	15	5	6	51	10	58	45	2	48	32	40	74	1
Brassica juncea (L.) Czern.	Bras	ah ph	Eur As-tm	195	49 556 415	164	31	6	20	36	3	30	11	71	18	0	59	21	10	105	0
Euphorbia peplus L.	Euph	ah	Eur Afr As-tm As-tr	195	31 991 802	160	35	16	23	9	5	35	8	49	49	1	55	26	27	87	0
Amaranthus retroflexus L.	Amar	ah	NAm	193	46 305 555	173	20	41	10	28	1	25	1	65	22	0	20	23	28	121	1
Eragrostis cilianensis (All.) Janch.	Poac	ag	Eur Afr As-tm As-tr	191	30 768 189	175	16	7	4	1	31	53	6	57	32	0	84	25	7	75	0
Vulpia myuros (L.) C. C. Gmel.	Poac	ag	Eur Afr As-tm As-tr	190	25 676 016	155	35	7	8	9	4	50	7	61	43	1	50	33	30	77	0
Cirsium vulgare (Savi) Ten.	Comp	bh	Eur Afr As-tm As-tr	189	32 595 340	164	25	3	12	6	0	47	9	64	48	0	56	21	20	90	2
Convolvulus arvensis L.	Conv	ph	Eur Afr As-tm As-tr	189	38 071 286	175	14	4	17	24	11	31	3	59	40	0	48	27	22	92	0
Rumex acetosella L.	Poly	ph	Eur Afr As-tm As-tr	188	32 402 187	153	35	2	2	19	8	36	3	66	46	6	39	17	25	101	6
Dactyloctenium aegyptium (L.) Willd.	Poac	ag pg	Eur Afr As-tm As-tr	186	19 234 210	122	64	4	3	2	33	16	36	49	43	0	138	21	6	21	0
Poa pratensis L.	Poac	bg pg	Eur Afr As-tm As-tr NAm	186	35 305 146	154	32	1	4	25	3	28	3	75	41	6	32	22	14	111	7
Spergula arvensis L.	Cary	ah	Eur Afr As-tm	186	38 817 548	164	22	7	16	12	34	21	4	57	35	0	72	4	17	91	2
Celosia argentea L.	Amar	ah	cult	185	49 536 666	156	29	1	36	33	36	5	14	24	36	0	114	9	1	61	0
Carica papaya L.	Cari	s t	NAm SAm	184	22 975 791	63	121	0	45	5	5	5	75	2	47	0	171	1	1	11	0
Veronica persica Poir.	Plan	ah	Eur Afr As-tm	183	35 973 228	150	33	40	13	14	3	25	0	59	29	0	25	16	30	109	3
Sisymbrium officinale (L.) Scop.	Bras	ah	Eur Afr As-tm As-tr	181	36 586 736	155	26	9	9	17	2	30	6	64	44	0	41	15	20	103	2
Setaria verticillata (L.) P. Beauv.	Poac	ag	Eur Afr As-tm As-tr NAm SAm	180	27 806 080	137	43	13	5	4	7	43	24	64	20	0	61	40	12	67	0
Vicia sativa L.	Legu	ah	Eur Afr As-tm As-tr	180	39 145 059	156	24	14	15	20	14	26	0	71	20	0	38	18	26	97	1

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								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Lactuca serriola L.	Comp	ah bh	Eur Afr As-tm As-tr	179	32 279 115	167	12	19	13	10	0	51	0	59	27	0	37	28	21	93	0
Medicago lupulina L.	Legu	ah ph	Eur Afr As-tm As-tr	177	32 367 512	154	23	2	13	6	11	28	6	64	47	0	54	17	20	84	2
Hibiscus trionum L.	Malv	ah	Eur Afr As-tm As-tr	175	40 333 284	165	10	9	14	35	31	28	0	57	1	0	51	20	10	94	0
Ipomoea purpurea (L.) Roth	Conv	ah	NAm SAm	175	39 033 693	155	20	13	21	39	34	12	1	50	5	0	65	8	11	91	0
Pennisetum purpureum Schumach.	Poac	bg pg	Afr	175	29 834 308	125	50	0	38	11	37	13	20	23	33	0	143	9	8	15	0
Ipomoea batatas (L.) Lam.	Conv	ah ph	NAm	173	33 897 846	104	69	0	37	34	4	7	45	12	34	0	114	7	2	50	0
Ipomoea nil (L.) Roth	Conv	ah	NAm SAm	173	36 477 091	154	19	4	25	27	36	11	0	35	35	0	93	13	5	62	0
Capsicum annuum L.	Sola	ah ph s	NAm SAm	172	34 231 391	94	78	2	40	34	5	9	56	13	13	0	113	8	4	47	0
Cyanthillium cinereum (L.) H. Rob.	Comp	ah	Afr As-tm As-tr Aus	172	17 532 026	58	114	0	60	9	7	5	59	7	25	0	155	7	1	9	0
Bromus catharticus Vahl	Poac	ag bg pg	SAm	171	26 459 142	140	31	16	27	9	4	47	7	58	2	1	56	37	18	60	0
Conium maculatum L.	Apia	bh	Eur Afr As-tm As-tr	171	31 229 451	154	17	8	12	12	0	31	0	62	46	0	33	19	24	93	2
Marrubium vulgare L.	Lami	ph	Eur Afr As-tm As-tr	171	22 601 457	155	16	6	3	1	0	41	2	73	45	0	39	40	24	68	0
Cichorium intybus L.	Comp	bh ph	Eur Afr As-tm As-tr	170	29 918 006	147	23	8	15	12	5	33	1	62	34	0	40	17	21	92	0
Senecio vulgaris L.	Comp	ah bh	Eur Afr As-tm As-tr	169	35 005 093	143	26	4	8	22	5	16	2	82	28	2	28	19	18	101	3
Sida rhombifolia L.	Malv	ah ph s	Afr As-tm As-tr NAm SAm	169	14 193 615	77	92	2	9	10	32	27	77	9	3	0	139	6	3	21	0
Xanthium spinosum L.	Comp	ah	SAm	169	26 964 940	155	14	21	17	12	0	44	0	47	28	0	33	32	31	73	0
Coix lacryma-jobi L.	Poac	ag pg	As-tm As-tr	168	26 969 390	124	44	2	27	25	33	5	30	15	31	0	125	3	3	37	0
Anthemis cotula L.	Comp	ah	Eur Afr As-tm As-tr	167	25 492 627	143	24	11	11	8	3	19	4	65	44	2	34	18	20	93	2
Cenchrus echinatus L.	Poac	ag	NAm SAm	167	11 170 657	71	96	0	7	5	5	41	87	4	18	0	127	22	8	10	0

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								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Silybum marianum (L.) Gaertn.	Comp	ah bh	Eur Afr As-tm As-tr	167	30 907 784	147	20	9	7	34	0	38	0	41	38	0	35	17	19	95	1
Trifolium pratense L.	Legu	bh ph	Eur Afr As-tm As-tr NAm	166	31 972 827	138	28	7	10	25	8	18	0	66	32	0	34	8	12	105	7
Psidium guajava L.	Myrt	t	NAm SAm	165	26 292 569	71	94	1	47	7	7	10	60	3	30	0	144	5	1	15	0
Raphanus raphanistrum subsp. *sativus* (L.) Domin	Bras	ah bh	Eur Afr As-tm As-tr	165	31 438 514	122	43	4	13	4	1	11	19	63	50	0	51	13	21	78	2
Asclepias curassavica L.	Apoc	ph s	NAm SAm	164	22 178 624	105	59	2	21	17	39	26	41	5	13	0	124	7	10	23	0
Urtica urens L.	Urti	ah	Eur	164	31 823 784	136	28	9	7	3	0	50	2	44	49	0	42	29	23	67	3
Nerium oleander L.	Apoc	s t	Eur Afr As-tm As-tr	162	19 263 008	103	59	0	29	2	33	17	36	32	13	0	125	21	4	12	0
Nicandra physalodes (L.) Gaertn.	Sola	ah	SAm	162	32 296 818	130	32	15	38	9	3	27	7	46	17	0	71	11	8	72	0
Rapistrum rugosum (L.) All.	Bras	ah	Eur Afr As-tm	162	24 300 462	147	15	15	7	20	1	43	1	32	43	0	39	30	23	69	1
Fallopia convolvulus (L.) Á. Löve	Poly	ah	Eur Afr As-tm As-tr	161	26 887 902	135	26	14	4	9	1	30	1	66	36	0	36	11	17	90	7
Malvastrum coromandelianum (L.) Garcke	Malv	ah ph s	NAm SAm	161	16 300 376	78	83	0	29	7	35	17	65	7	1	0	138	9	1	13	0
Phyllanthus amarus Schumach. et Thonn.	Phyl	ah	NAm SAm	161	17 272 114	34	127	0	48	5	8	9	85	3	3	0	148	5	0	8	0
Setaria viridis (L.) P. Beauv.	Poac	ag pg	Eur Afr As-tm As-tr	161	39 522 796	145	16	15	2	31	2	16	1	73	21	0	24	21	5	111	0
Achyranthes aspera L.	Amar	ah ph s	Eur Afr As-tm As-tr Aus NAm SAm	160	19 481 863	80	80	1	52	12	32	1	37	6	19	0	137	3	3	17	0
Hypochaeris radicata L.	Comp	ph	Eur	160	22 640 045	131	29	0	11	3	2	39	9	52	43	1	46	15	20	76	3
Lolium multiflorum Lam.	Poac	bg pg	Eur Afr As-tm As-tr	160	20 535 814	135	25	27	14	16	1	27	5	17	51	2	49	21	20	68	2
Malva parviflora L.	Malv	ah bh ph	Eur Afr As-tm	160	29 020 388	126	34	2	12	2	12	62	10	37	22	1	54	36	25	45	0
Citrullus lanatus (Thunb.) Matsum. et Nakai	Cucu	ah	Afr	159	24 482 573	120	39	5	9	0	12	53	25	40	15	0	76	31	11	41	0

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								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Salsola kali L.	Amar	ah	Eur Afr As-tm As-tr	159	24 656 147	138	21	5	11	2	0	33	5	79	24	0	24	34	29	72	0
Polypogon monspeliensis (L.) Desf.	Poac	ag	Eur Afr As-tm As-tr	158	30 581 632	142	16	5	13	0	6	52	5	49	27	1	41	34	25	58	0
Avena sativa L.	Poac	ag	Eur As-tm	157	32 754 421	127	30	9	14	6	4	31	5	64	24	0	39	21	10	85	2
Daucus carota L.	Apia	bh	Eur Afr As-tm As-tr	157	31 387 224	136	21	4	4	34	2	17	7	61	28	0	29	7	21	99	1
Cannabis sativa L.	Cannab	ah	As-tm	156	37 054 653	122	34	11	30	14	6	12	22	57	4	0	67	6	6	77	0
Holcus lanatus L.	Poac	pg	Eur Afr As-tm	156	24 623 567	125	31	2	8	8	2	29	5	58	38	6	37	11	17	88	3
Argemone mexicana L.	Papa	ah	NAm SAm	155	30 592 463	131	24	1	42	8	36	7	8	30	23	0	106	8	3	38	0
Agrostis stolonifera L.	Poac	pg	Eur Afr As-tm As-tr NAm	154	31 946 057	121	33	0	2	21	2	14	5	70	35	5	20	13	10	106	5
Bromus hordeaceus L.	Poac	ag bg	Eur Afr As-tm As-tr	154	23 145 853	122	32	0	9	5	1	42	5	56	35	1	27	18	32	75	2
Centaurea melitensis L.	Comp	ah bh	Eur Afr	154	18 440 869	135	19	0	11	1	0	56	8	25	53	0	51	37	32	34	0
Lolium temulentum L.	Poac	ag	Eur Afr As-tm	154	30 958 614	136	18	8	13	17	4	27	1	56	28	0	36	17	14	86	1
Robinia pseudoacacia L.	Legu	t	NAm	154	29 969 544	136	18	39	9	37	1	24	0	40	4	0	16	14	24	100	0
Clitoria ternatea L.	Legu	ph	SAm	152	29 795 074	105	47	0	29	8	36	14	15	14	36	0	126	15	1	10	0
Eragrostis amabilis (L.) Wight et Arn.	Poac	ag pg	Afr As-tm As-tr Pac	152	20 294 196	76	76	0	3	0	32	7	63	9	38	0	139	4	1	8	0
Rumex obtusifolius L.	Poly	ph	Eur Afr As-tm	152	27 450 191	128	24	5	3	3	3	19	3	80	33	3	41	22	6	82	1
Lamium amplexicaule L.	Lami	ah bh	Eur Afr As-tm As-tr	151	29 805 342	130	21	12	12	1	0	35	2	64	25	0	37	16	15	76	7
Casuarina equisetifolia L.	Casu	t	As-tr Aus Pac	150	12 013 439	60	90	0	27	7	12	2	64	23	15	0	129	11	4	6	0
Euphorbia cyathophora Murray	Euph	ah ph	NAm SAm	150	17 529 303	89	61	0	32	16	35	18	40	5	4	0	119	7	3	21	0
Panicum maximum Jacq.	Poac	bg pg	Afr As-tm	150	17 732 347	70	80	0	26	2	20	28	33	8	33	0	126	7	5	12	0
Silene gallica L.	Cary	ah bh	Eur Afr As-tm	150	17 261 060	123	27	9	5	3	7	44	7	28	47	0	44	19	28	59	0
Tamarindus indica L.	Legu	t	Afr As-tm	150	31 988 452	98	52	0	48	7	4	8	23	19	41	0	131	8	1	10	0
Pistia stratiotes L.	Arac	ph	Afr As-tm As-tr Aus NAm SAm	148	30 341 551	131	17	4	33	13	37	9	8	41	3	0	99	9	5	35	0

Taxon	Family	LH	Continent of native distribution	Regs total	Area total (km^2)	Main reg	Isl reg	Number of regions invaded on continents									Number of regions by zonobiomes				
								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Canna indica L.	Cannac	ph	NAm SAm	147	29 525 579	85	62	4	37	33	9	9	38	8	9	0	97	2	5	43	0
Nicotiana glauca Graham	Sola	s t	SAm	147	26 252 070	120	27	10	30	3	5	45	7	12	35	0	65	38	27	17	0
Nicotiana tabacum L.	Sola	ah ph	NAm	147	26 514 592	66	81	5	34	4	5	9	51	15	24	0	105	5	9	28	0
Sorghum bicolor (L.) Moench	Poac	ag pg	Afr	147	33 957 680	117	30	8	12	2	5	34	9	57	20	0	62	20	7	58	0
Xanthium strumarium L.	Comp	ah	Eur Afr As-tm As-tr NAm SAm	147	21 817 390	115	32	19	18	9	33	43	16	1	8	0	88	20	7	32	0
Antigonon leptopus Hook. et Arn.	Poly	ph	NAm SAm	146	19 725 809	81	65	0	22	3	35	10	35	8	33	0	127	6	0	13	0
Cerastium glomeratum Thuill.	Cary	ah	Eur Afr As-tm As-tr	146	24 920 389	125	21	2	2	3	4	44	1	49	39	2	36	20	20	69	1
Mentha spicata L.	Lami	ph	Eur As-tm	146	32 193 013	110	36	24	8	11	1	22	12	59	9	0	29	9	14	94	0
Tridax procumbens (L.) L.	Comp	ph	NAm SAm	146	23 964 688	91	55	0	55	4	40	18	28	0	1	0	132	11	1	2	0
Galinsoga quadriradiata Ruiz et Pav.	Comp	ah	NAm	145	29 992 102	117	28	39	21	14	7	1	4	50	9	0	33	0	8	104	0
Linum usitatissimum L.	Lina	ah	cult	145	34 423 273	126	19	13	4	35	1	22	0	59	11	0	19	8	14	104	0
Phalaris canariensis L.	Poac	ag	Eur Afr	145	28 514 531	119	26	22	14	5	1	23	0	62	18	0	27	7	22	87	2
Bryophyllum pinnatum (Lam.) Oken	Cras	ph	Afr	143	12 842 328	56	87	1	38	4	23	12	34	1	30	0	131	0	1	11	0
Mangifera indica L.	Anac	t	As-tr	143	17 707 307	53	90	0	47	5	0	9	58	2	22	0	135	3	0	5	0
Synedrella nodiflora (L.) Gaertn.	Comp	ah ph	NAm SAm	143	18 673 592	66	77	0	33	6	40	7	55	1	1	0	134	3	0	6	0
Momordica charantia L.	Cucu	ah	Afr As-tm As-tr Aus Pac	142	31 829 783	101	41	0	33	6	3	8	25	29	38	0	114	11	0	17	0
Cenchrus ciliaris L.	Poac	bg pg	Eur Afr As-tm As-tr	141	20 156 461	114	27	1	7	1	4	50	12	39	27	0	82	40	8	11	0
Leucanthemum vulgare (Vaill.) Lam.	Comp	ph	Eur As-tm NAm	141	27 490 636	114	27	8	8	8	10	12	4	64	25	2	32	6	10	84	9
Lobularia maritima (L.) Desv.	Bras	ah ph	Eur Afr As-tm	141	21 645 056	115	26	12	13	9	0	22	7	53	25	0	36	17	17	71	0
Vinca major L.	Apoc	ph s	Eur As-tm	141	19 100 264	118	23	18	9	2	6	29	1	48	28	0	38	20	27	56	0
Briza minor L.	Poac	ag	Eur Afr As-tm	140	15 647 893	115	25	3	15	7	7	39	7	24	38	0	49	17	26	48	0
Gomphrena globosa L.	Amar	ah	SAm	140	24 320 625	85	55	0	13	34	8	0	34	19	32	0	93	2	0	45	0

Taxon	Family	LH	Continent of native distribution	Regs total	Area total (km²)	Main reg	Isl reg	Number of regions invaded on continents									Number of regions by zonobiomes				
								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Helianthus tuberosus L.	Comp	ph	NAm	140	30 212 811	119	21	40	5	46	1	7	0	33	8	0	7	6	16	111	0
Vaccaria hispanica (Mill.) Rauschert	Cary	ah	Eur Afr As-tm	140	26 223 559	131	9	5	8	6	31	24	0	57	9	0	49	12	8	71	0
Albizia lebbeck (L.) Benth.	Legu	t	As-tm As-tr Aus SAm	139	21 304 895	87	52	0	32	7	34	5	27	17	17	0	121	12	0	6	0
Opuntia ficus-indica (L.) Mill.	Cact	s	SAm	139	33 129 116	104	35	11	40	9	7	14	9	11	38	0	79	20	17	23	0
Paspalum dilatatum Poir.	Poac	pg	SAm	139	25 435 954	104	35	10	23	12	4	44	14	26	5	1	61	19	19	40	0
Trifolium dubium Sibth.	Legu	ah	Eur Afr As-tm	139	20 089 327	119	20	0	4	3	10	36	3	52	30	1	37	12	22	67	1
Arachis hypogaea L.	Legu	ah ph	cult	138	25 745 734	118	20	0	27	22	2	2	10	40	35	0	80	8	0	50	0
Datura metel L.	Sola	ah	SAm	138	23 090 611	79	59	0	51	9	35	10	21	0	12	0	113	9	8	8	0
Sisymbrium orientale L.	Bras	ah	Eur Afr As-tm As-tr	138	21 508 729	121	17	14	9	6	1	60	0	14	34	0	35	37	26	40	0
Vulpia bromoides (L.) Gray	Poac	ag	Eur Afr As-tm	138	17 328 111	114	24	0	6	2	2	37	6	37	45	3	40	20	22	54	2
Eragrostis pilosa (L.) P. Beauv.	Poac	ag	Eur Afr As-tm As-tr NAm	137	24 415 336	117	20	14	3	0	2	21	6	45	46	0	64	8	4	61	0
Sida acuta Burm. f.	Malv	ph s	As-tm As-tr NAm SAm	137	10 319 271	62	75	0	25	8	32	16	47	8	1	0	116	8	1	12	0
Eclipta prostrata (L.) L.	Comp	ah ph	NAm SAm	135	26 357 515	86	49	6	45	5	35	1	37	4	2	0	108	10	7	10	0
Brassica nigra (L.) K. Koch	Bras	ah	Eur Afr As-tm	134	31 424 504	116	18	10	8	8	0	10	5	78	15	0	24	20	7	83	0
Euphorbia helioscopia L.	Euph	ah	Eur Afr As-tm As-tr	134	28 288 358	118	16	10	11	25	8	24	0	44	12	0	28	11	12	83	0
Euphorbia heterophylla L.	Euph	ah ph	NAm SAm	132	28 710 659	106	26	0	41	20	38	14	14	1	4	0	102	14	2	14	0
Pennisetum glaucum (L.) R. Br.	Poac	ag pg	Afr	132	30 129 746	121	11	0	19	33	33	9	6	21	11	0	70	5	4	53	0
Coriandrum sativum L.	Apia	ah	Eur	131	30 630 213	105	26	12	14	37	3	14	5	35	11	0	29	12	6	84	0
Phleum pratense L.	Poac	pg	Eur Afr As-tm As-tr	131	24 412 421	97	34	8	1	24	1	16	3	66	10	2	11	7	8	96	9
Setaria pumila (Poir.) Roem. et Schult.	Poac	ag	Eur Afr As-tm As-tr Pac	131	21 457 986	104	27	7	3	8	0	32	12	60	9	0	38	14	7	72	0
Tribulus terrestris L.	Zygo	ah	Eur Afr As-tm As-tr Aus	130	19 231 132	122	8	3	1	0	32	26	5	44	19	0	56	27	1	46	0
Trifolium hybridum L.	Legu	ah ph	Eur Afr As-tm	130	26 633 310	106	24	25	2	18	7	10	1	65	2	0	15	4	4	102	5

Taxon	Family	LH	Continent of native distribution	Regs total	Area total (km^2)	Main reg	Isl reg	Number of regions invaded on continents									Number of regions by zonobiomes				
								Eur	Afr	As-tm	As-tr	Aus	Pac	NAm	SAm	Ant	I-II	III	IV	V-VIII	IX
Urena lobata L.	Malv	s	As-tm As-tr Aus SAm	130	24 335 279	88	42	0	43	15	31	9	29	1	2	0	111	5	0	14	0
Amaranthus albus L.	Amar	ah	NAm	129	28 480 332	116	13	35	0	18	0	25	0	47	4	0	4	17	22	86	0
Triticum aestivum L.	Poac	ag bg	cult	129	30 166 543	104	25	10	11	1	1	29	7	61	9	0	33	16	6	73	1
Acanthospermum hispidum DC.	Comp	ah ph	SAm	128	28 528 196	114	14	0	49	4	33	23	9	9	1	0	101	14	2	11	0
Brassica napus L.	Bras	ah bh	Eur	128	25 939 661	99	29	19	7	4	0	20	1	63	12	2	15	10	19	82	2
Fagopyrum esculentum Moench	Poly	ah	As-tm	128	35 579 602	113	15	12	10	36	2	10	0	58	0	0	18	5	4	101	0
Acacia farnesiana (L.) Willd.	Legu	s t	NAm SAm	127	26 267 253	91	36	2	21	10	38	31	18	4	3	0	89	15	10	13	0
Arrhenatherum elatius (L.) P. Beauv. ex J. et C. Presl.	Poac	pg	Eur Afr As-tm	127	25 050 806	113	14	10	2	36	1	9	2	49	16	2	14	3	7	101	2
Sisymbrium irio L.	Bras	ah	Eur Afr As-tm As-tr	127	22 797 687	117	10	8	13	4	1	47	1	20	33	0	36	36	17	37	1
Veronica arvensis L.	Plan	ah	Eur Afr As-tm As-tr	127	23 817 742	105	22	0	5	11	3	28	3	60	17	0	24	11	12	78	2
Alternanthera sessilis (L.) R. Br. ex DC.	Amar	ah ph	As-tm As-tr Aus	126	27 639 448	78	48	1	66	13	7	7	31	0	1	0	102	10	1	13	0
Chloris virgata Sw.	Poac	ag pg	Afr As-tm As-tr NAm SAm	126	21 326 438	101	25	1	3	22	1	48	15	30	6	0	43	25	9	49	0
Datura innoxia Mill.	Sola	ah	NAm SAm	126	31 081 289	114	12	11	29	11	32	34	0	0	9	0	68	28	18	12	0
Melilotus officinalis (L.) Pall.	Legu	ah bh ph	Eur As-tm As-tr	126	36 062 914	106	20	13	7	17	1	11	0	68	8	1	10	9	9	95	3
Panicum miliaceum L.	Poac	ag	As-tm	126	23 822 914	106	20	15	6	3	2	26	4	55	15	0	36	8	12	70	0
Thlaspi arvense L.	Bras	ah	Eur As-tm As-tr	126	37 145 363	111	15	8	8	30	1	4	0	68	7	0	11	4	3	106	2
Trifolium campestre Schreb.	Legu	ah bh	Eur Afr As-tm	126	22 853 579	110	16	1	7	5	2	37	1	55	18	0	23	13	22	67	1
Brassica oleracea L.	Bras	ph	Eur	125	28 899 405	79	46	5	11	32	1	15	23	31	6	1	35	11	8	70	1
Chloris gayana Kunth	Poac	pg	Eur Afr	125	17 191 262	104	21	1	12	9	3	50	9	33	8	0	65	31	8	21	0
Emilia sonchifolia (L.) DC. ex DC.	Comp	ah	As-tm As-tr	125	15 073 463	68	57	0	12	12	32	13	34	9	13	0	101	4	1	19	0
Saponaria officinalis L.	Cary	ph	Eur As-tm	125	27 645 220	110	15	14	4	11	0	10	0	59	27	0	14	6	12	93	0
Tanacetum parthenium (L.) Sch. Bip.	Comp	ph	Eur As-tm	125	22 852 795	106	19	25	8	2	0	11	0	42	37	0	17	10	22	75	1

Table 4. – The most widely distributed naturalized plant species by zonobiomes (see text for description). Ten species with the highest frequency of occurrence in each biome (expressed as the percentage of the total, n) are shown.

I, II Tropical (n = 447)	
49.2	*Euphorbia hirta*
49.0	*Ricinus communis*
43.6	*Sonchus oleraceus*
41.8	*Leucaena leucocephala*
41.6	*Bidens pilosa*
40.7	*Eleusine indica*
39.1	*Catharanthus roseus*
38.3	*Carica papaya*
37.8	*Euphorbia prostrata*
37.6	*Portulaca oleracea*

III Subtropical (n = 85)	
69.4	*Sonchus oleraceus*
68.2	*Chenopodium murale*
63.5	*Erodium cicutarium*
55.3	*Ricinus communis*
52.9	*Medicago polymorpha*
49.4	*Cynodon dactylon*
49.4	*Chenopodium album*
47.1	*Cenchrus ciliaris*
47.1	*Setaria verticillata*
47.1	*Marrubium vulgare*

IV Mediterranean (n = 80)	
53.8	*Sonchus oleraceus*
50.0	*Anagallis arvensis*
48.8	*Erigeron bonariensis*
48.8	*Erodium cicutarium*
47.5	*Chenopodium album*
47.5	*Mesembryanthemum crystallinum*
46.3	*Medicago sativa*
42.5	*Chenopodium murale*
42.5	*Melilotus indicus*
41.3	*Amaranthus hybridus*
40.0	*Centaurea melitensis*

V–VIII Temperate (n = 214)	
68.2	*Erigeron canadensis*
64.0	*Lolium perenne*
62.1	*Chenopodium album*
60.7	*Capsella bursa-pastoris*
60.3	*Stellaria media*
59.8	*Brassica rapa*
57.9	*Datura stramonium*
57.9	*Echinochloa crus-galli*
56.5	*Amaranthus retroflexus*
56.5	*Poa annua*

IX Arctic (n = 18)	
55.6	*Alopecurus pratensis*
50.0	*Dactylis glomerata*
50.0	*Phleum pratense*
50.0	*Leucanthemum vulgare*
50.0	*Deschampsia cespitosa*
44.4	*Matricaria matricarioides*
38.9	*Poa annua*
38.9	*Poa pratensis*
38.9	*Trifolium pratense*
38.9	*Fallopia convolvulus*
38.9	*Lamium amplexicaule*
38.9	*Lamium purpureum*
38.9	*Anthriscus sylvestris*

Some of those most widespread species belong to the ones most successful in multiple zonobiomes such as *Chenopodium album* in subtropical, mediterranean, and temperate regions, *Sonchus oleraceus* in tropical, subtropical and mediterranean, or *Ricinus communis* and *Bidens pilosa* in both tropical and subtropical regions. Species that are the most widespread in particular zonobiomes are shown in Table 4. One pattern inferred from the comparison of the five zonobiomes is that in temperate and subtropical regions the frequencies that the most widespread taxa reach are the highest, with *Erigeron canadensis*, *Sonchus oleraceus* and *Chenopodium murale* all naturalized in nearly 70%

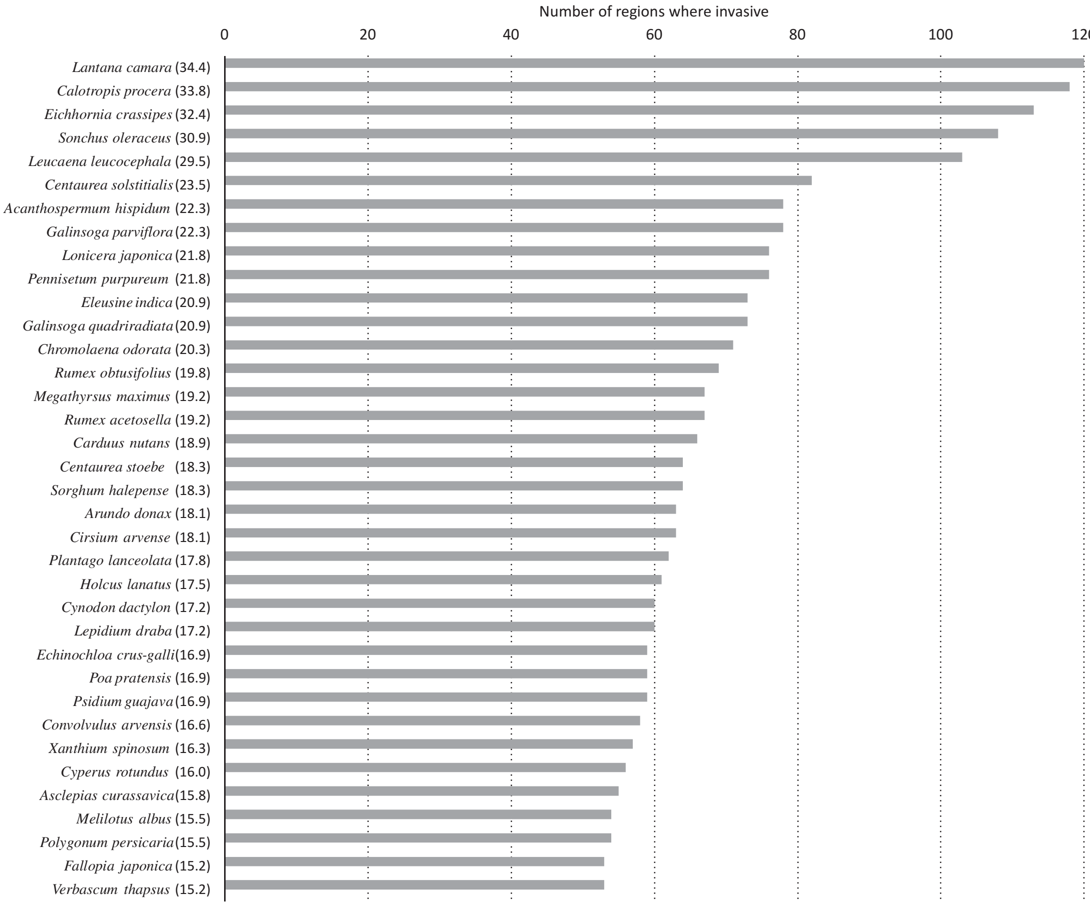

Fig. 7. – Species recorded as invasive in at least 15% of regions for which the data are available (n = 349). Percentage of the total number of regions is given in parentheses following the species name.

of regions, and all the top 10 species in the temperate region reach higher percentages than the most widespread species in all other zonobiomes except the subtropical one (Table 4).

Using the occurrence as invasive rather than only naturalized yields a different ranking, with the following species occurring in more than 25% of regions where the data on invasiveness are available (n = 349): *Lantana camara* (120 regions), *Calotropis procera* (118), *Eichhornia crassipes* (113), *Sonchus oleraceus* (108) and *Leucaena leucocephala* (103). Overall, there are 36 species reported as invasive from at least 15% of regions (corresponding to 53 regions or more; Fig. 7).

Life history and origin of global naturalized alien flora

The best represented life histories among the global naturalized flora are perennial forbs, composing more than one third of all taxa (34.4%), with perennial grasses adding another

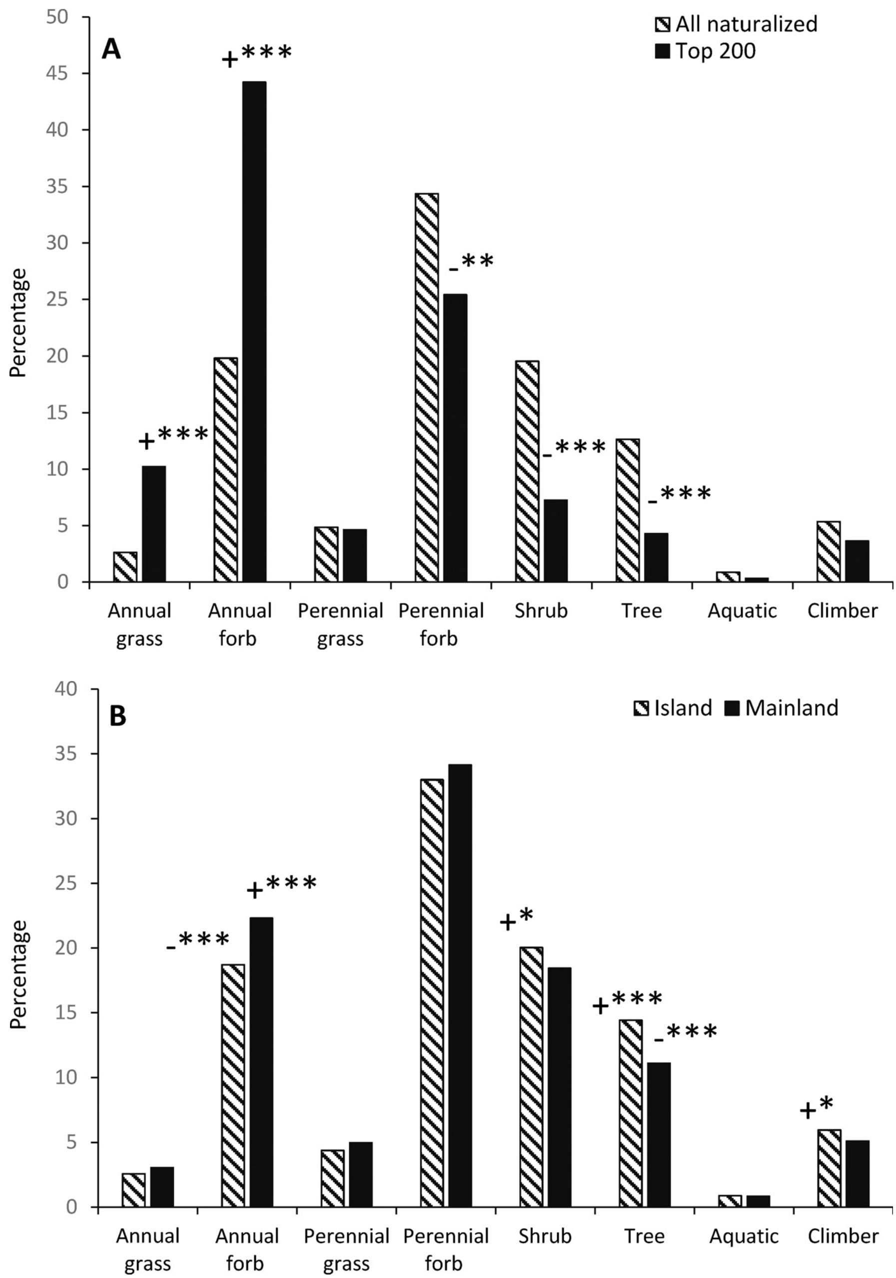

Fig. 8. – Life history spectra for (A) all naturalized aliens with this information available (n = 13,164) and the 200 most widely distributed as listed in Table 3, and (B) for all naturalized aliens recorded on islands (n = 8019) and in mainland regions (n = 10,345). Taxa that occur with more than one life history were counted in each, biennial species were included within perennial life history. The 200 most widely distributed taxa significantly differ from the complete data set ($\chi^2 = 166.4$, df = 7, $P < 0.001$), and so do islands from mainland regions ($\chi^2 = 115.9$, df = 7, $P < 0.001$). Plus and minus signs indicate a significant over- and under-representation, respectively, at P *** < 0.001, ** < 0.01 and * < 0.05.

4.8% to the total of 39.2% that are non-woody perennials. Woody plants and annuals make up 32.1% and 22.4%, respectively, of all naturalized taxa (Fig. 8A). Taking into account how widely distributed the species are provides a dramatically different picture; among the top 200 (as listed in Table 3), there is a significantly higher representation of annuals, both forbs (44.2%) and grasses (10.2%). Accordingly, all other life histories except perennial grasses are disproportionally fewer among the most widely distributed naturalized species; woody species drop to about a half from 22.4% of all naturalized species, to 11.6% of the 200 most widespread species, and the differences are statistically significant. The representation of aquatic plants is below 1% for both groups, but that of climbers drops from 5.3% among all naturalized to 3.6% among the top 200 (see Fig. 8A for the statistics). The most widely distributed representatives of particular life histories can be inferred from Table 3.

We also found some less pronounced but significant differences between life history spectra of complete naturalized floras of mainland and island regions. Islands harbour more woody species (34.4%) than mainland regions (29.5%), and fewer annual herbs, with 18.7% on islands compared to 22.3% in mainland regions (Fig. 8B).

The majority of species that have become naturalized in at least one region of the world originate from Asia (32.0%, with temperate contributing 20.3% and tropical 11.7%), North America (17.1%), Europe (15.1%) and Africa (14.3%), with other continents contributing less (South America 12.8%, Australasia 5.5%, Pacific Islands 2.0%); taxa originated in cultivation (1.0%) or by hybridization (0.2%) have a negligible representation (Fig. 9). The contributions of particular continents, however, change markedly if the same frequency distribution is displayed for the 200 most widely distributed species (as listed in Table 3). For this group of highly successful species, measured by the number of GloNAF regions invaded, the contribution of Europe (18.7%), Africa (19.6%) and tropical Asia (15.8%) significantly increases while that of Australasia (1.8%), and North America (9.9%) is markedly lower, suggesting a reduced role of the latter regions, opposite to the former ones, in donating high numbers of the world's most successful naturalized aliens (Fig. 9).

Higher taxonomic levels and phylogenetic patterns

Ranking families by their absolute number of naturalized species reveals that those that are generally richest in species also contribute most to the global naturalized alien flora, i.e. *Compositae* (1343 taxa; 10.2% of the total recorded in GloNAF), *Poaceae* (1267; 9.8%) and *Leguminosae* (1189; 9.0%); none of the other families exceed 600 naturalized species globally (Table 5). *Orchidaceae*, the most species-rich family, however, is heavily under-represented with only 73 naturalized alien species (Fig. 10).

As for species, and bearing in mind that the ratio of the total number of naturalized species in mainland and island regions is approximately 3:2 (Table 1), some families are disproportionally represented on islands, including *Arecaceae*, *Araceae*, *Acanthaceae*, *Amaryllidaceae*, *Asparagaceae*, *Convolvulaceae*, *Rubiaceae* and *Malvaceae*. In contrast, fewer families appear to contain disproportionally more naturalized alien species in mainland than island regions, and even in those cases, this imbalance is less profound, e.g. *Brassicaceae*, *Caryophyllaceae* and *Boraginaceae*. Families that are not only rich in naturalized species but also fairly widespread (i.e. representatives are recorded in many

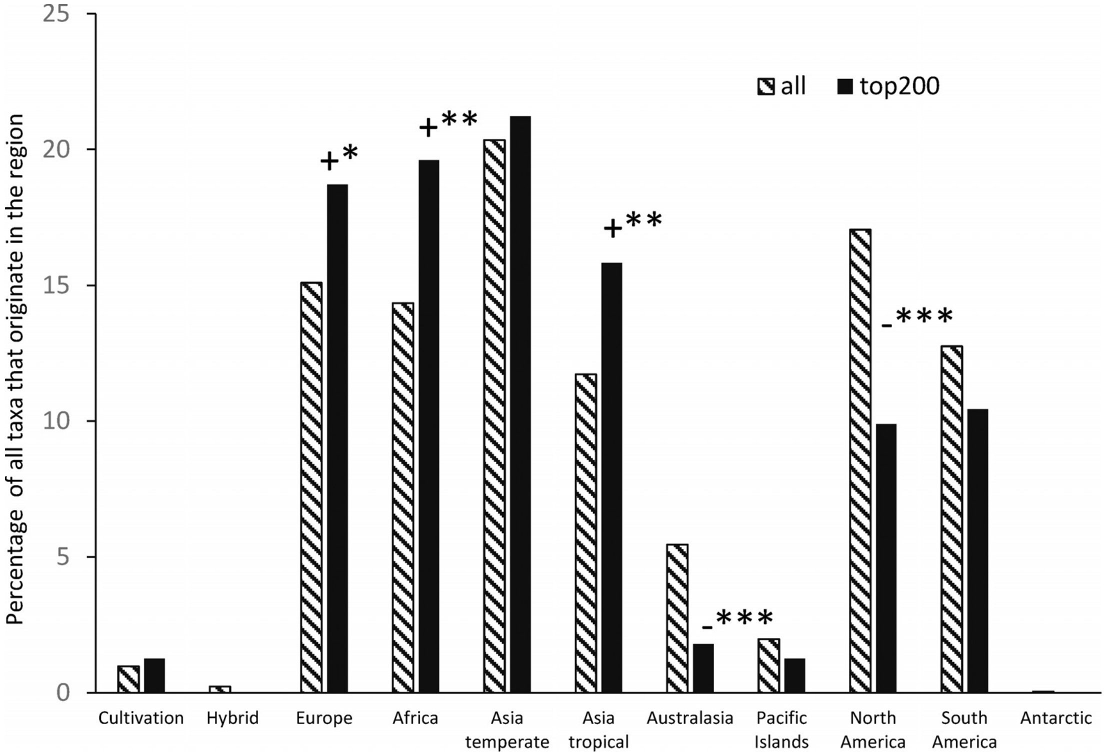

Fig. 9. – Origins of the 200 most widespread species representing the donor regions (TDWG continents) for the world's most widely distributed naturalized plants, compared with the frequency distribution of native regions of all taxa where this information was available (n = 13,164). Taxa with native ranges spanning over multiple TDWG regions were considered in each. The 200 most widely distributed taxa significantly differ from the complete data set ($\chi^2 = 65.9$, df = 10, $P < 0.001$); the plus and minus signs indicate a significant over- and under-representation, respectively, at P *** < 0.001, ** < 0.01 and * < 0.05.

regions) include the *Brassicaceae*, *Amaranthaceae*, *Solanaceae*, *Caryophyllaceae* and *Euphorbiaceae*, while the opposite holds true for *Cyperaceae*, *Rosaceae* and *Iridaceae* (Table 5).

However, the absolute naturalized species richness of a family does not inform us about its naturalization success, unless it is related to the total number of species within the family (Fig. 10). In relative terms, some of the large species-rich families are over-represented among naturalized aliens (e.g. *Poaceae*, *Leguminosae*, *Rosaceae*, *Amaranthaceae*, *Pinaceae*), whereas some are under-represented (e.g. *Euphorbiaceae*, *Rubiaceae*, *Orchidaceae*), and the family with the highest number of naturalized alien species, the *Compositae*, is proportional to its global species richness (Fig. 10). Taking into account the position within the phylogenetic tree of vascular plants (Fig. 11), there is, based on a randomization test, a significant phylogenetic signal (P = 0.0341). This indicates that certain clades of closely related families have a more similar proportion of species naturalized than expected by chance.

Table 5. – Families that are most represented in the global naturalized alien flora. The top 30 families, ranked by the total number of naturalized species, are shown. The number of species-by-region records is given as a quantitative indication of how widespread the naturalized species of a given family are (a proxy for its 'global abundance'). The total worldwide number of species in the family is taken from The Plant List (version 1.1; http://www.theplantlist.org).

Family	Total number of naturalized species	Number of species × region records	Number of naturalized species on mainland	Number of naturalized species on islands	Number of species in the family
Compositae	1343	20,972	1133	710	36,701
Poaceae	1267	24,328	1078	737	11,883
Leguminosae	1189	16,883	929	728	26,832
Rosaceae	548	4978	441	317	5325
Lamiaceae	356	4872	288	227	8602
Cyperaceae	331	2341	246	185	6265
Brassicaceae	311	8083	283	161	4507
Malvaceae	258	4390	190	178	4652
Amaranthaceae	251	6562	227	140	2212
Solanaceae	235	4981	200	156	2768
Plantaginaceae	229	3452	187	140	1848
Caryophyllaceae	217	4404	200	110	2866
Euphorbiaceae	204	4245	168	125	6835
Boraginaceae	200	2365	174	95	2976
Polygonaceae	186	3398	160	115	1584
Iridaceae	178	1312	140	116	2456
Rubiaceae	176	1786	124	115	14,269
Onagraceae	171	1545	142	88	990
Apiaceae	170	2658	150	95	3509
Myrtaceae	156	1309	113	114	6141
Convolvulaceae	153	2575	119	111	1409
Ranunculaceae	148	1321	127	74	2769
Asparagaceae	147	1609	108	107	3093
Amaryllidaceae	142	1413	101	103	2375
Acanthaceae	130	1066	81	95	4021
Arecaceae	125	567	42	115	2625
Araceae	119	1102	65	93	3459
Crassulaceae	118	1058	86	82	1671
Apocynaceae	115	1917	78	71	5745
Cactaceae	97	964	78	54	2715

Plant families with disproportionally high or low representation of naturalized alien species are therefore distributed non-randomly over the phylogeny (Electronic Appendix 3). Among monocots, there are 21 over-represented families, 12 of these are in the Commelinid clade (which has 31 families in total). This includes *Arecaceae*, *Commelinaceae* and *Poaceae*. In the *Alismatales*, five out of 13 families are over-represented. There are also clades with mostly under-represented families, such as the *Pandanales-Dioscoreales* (seven out of eight families), and the *Liliales* (seven out of 10 families). Among Magnoliids, 14 out of 21 families are under-represented and only one (*Saururaceae*) is over-represented. For Rosids, within the Eurosid-I clade (the *Fabales-Rosales-Fagales* branch), 10 out of 28 families are over-represented. For the rest of the Eurosid-I clade, there are 46 families, but only four are over-represented

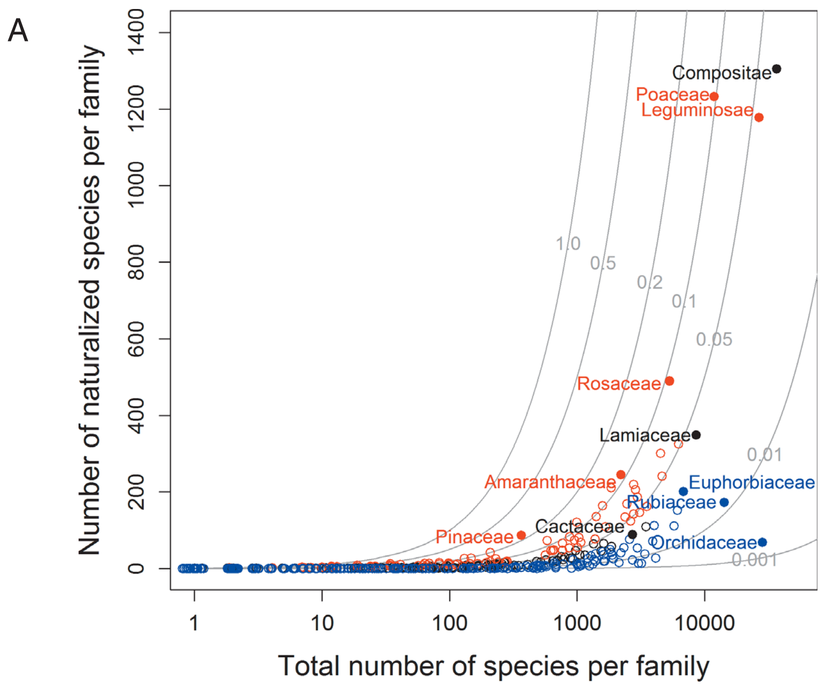

Fig. 10. – Families that are over- and under-represented by naturalized alien species among the global vascular flora. Number of naturalized species per family vs the total number of species per family (on a $\log_{10}$ scale). Grey isoclines indicate the proportion of species in a family that has become naturalized somewhere in the world. Red dots are over-represented families and blue dots are under-represented families. Black dots are families that fall within the range of expected values. The names of a selective number of families are given in the plot.

(*Oxalidaceae*, *Elatinaceae*, *Hypericaceae*, *Salicaceae*), while 33 are under-represented, and nine are as expected. For Eurosid II (malvids), there are 57 families, but only six are over-represented (*Geraniaceae*, *Onagraceae*, *Lythraceae*, *Melianthaceae*, *Malvaceae*, and *Resedaceae*).

Solanum (112 species), *Euphorbia* (108) and *Carex* (106) are the only three genera with more than 100 naturalized species (Table 6). The genera with obvious over-representation on islands are *Cotoneaster*, *Juncus*, *Eucalyptus*, *Salix*, *Hypericum*, *Geranium* and *Persicaria*, while those relatively richer in naturalized species in mainland regions are *Atriplex*, *Opuntia*, *Oenothera*, *Artemisia*, *Vicia*, *Galium* and *Rosa*. Using the ranking according the species × region measure, *Amaranthus*, *Bromus*, *Lepidium*, *Chenopodium*, *Medicago* and *Senna* are genera with higher positions than that based on the number of species alone, while *Carex* is an example of a genus whose numerous representatives only have rather limited distributions as naturalized species (Table 6).

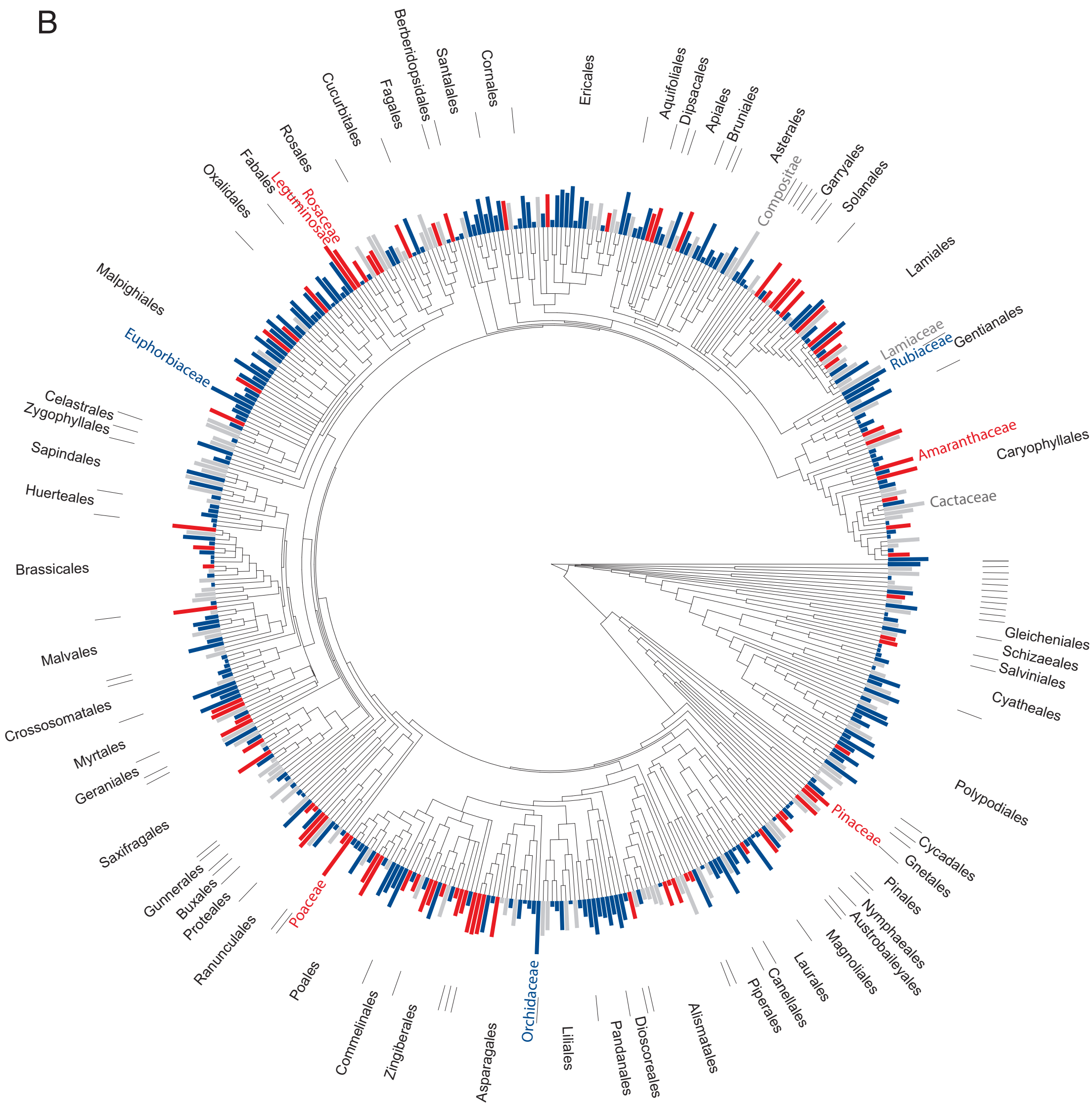

Fig. 11. – Families that are over- and under-represented by naturalized alien species among the global vascular flora. Phylogenetic tree of all vascular plant families. The sizes of the bars are proportional to the natural log of the number of species in a family. Red and blue bars and family names correspond to families that are significantly over-represented and under-represented, respectively, grey bars and black names indicate no significant difference. The phylogenetic signal is significant at P = 0.0341 (see text for explanation). Only families displayed in Fig. 10 are indicated by name, together with clades; for a complete tree with all family names see Electronic Appendix 3.

Table 6. – Genera that are most represented in global naturalized floras. The top 50 genera, ranked by the total number of naturalized species, are shown. The number of species-by-region records is given as a quantitative indication of how widespread the species of a given genus are (a proxy for the genus' 'global abundance'). The total worldwide number of species in the family is taken from The Plant List (version 1.1; http://www.theplantlist.org).

Genus	Total number of naturalized species	Number of species × region records	Number of naturalized species on mainland	Number of naturalized species on islands	Number of species in the genus
Solanum	112	1859	93	74	1230
Euphorbia	108	2694	90	69	2160
Carex	106	366	79	57	2289
Oenothera	89	880	80	40	207
Rubus	84	577	67	48	1568
Acacia	80	770	62	50	1495
Cotoneaster	80	404	43	68	294
Cyperus	79	1171	63	50	748
Eucalyptus	78	436	55	56	859
Trifolium	70	1848	65	43	339
Juncus	66	550	49	48	393
Rumex	63	1253	55	34	183
Rosa	56	671	51	28	435
Eragrostis	55	1239	49	30	427
Ipomoea	55	1384	47	42	468
Crotalaria	52	761	39	33	757
Silene	52	939	46	30	558
Pinus	50	494	41	34	175
Salix	50	732	38	38	627
Veronica	50	1155	45	33	234
Hypericum	49	283	34	32	524
Artemisia	48	703	43	22	530
Geranium	48	598	36	34	428
Senecio	47	509	35	29	1666
Atriplex	46	583	43	17	305
Oxalis	46	905	37	30	545
Plantago	46	836	40	25	185
Potentilla	46	380	38	23	381
Ranunculus	45	589	37	25	484
Chenopodium	44	1152	40	26	164
Paspalum	44	714	35	29	329
Persicaria	44	684	37	35	71
Salvia	44	563	36	28	1037
Taraxacum	44	375	28	21	2336
Prunus	43	688	38	23	286
Passiflora	42	549	32	28	534
Vicia	42	914	42	23	289
Bromus	41	1385	38	31	181
Allium	40	419	35	22	972
Amaranthus	40	1987	38	29	113
Panicum	40	624	35	21	442
Sedum	40	426	32	28	421
Senna	40	1096	34	28	351
Lepidium	39	1228	37	20	253
Centaurea	38	790	34	21	922
Opuntia	38	586	36	15	226
Ficus	37	346	23	25	911
Medicago	37	1099	30	24	122
Galium	35	443	31	17	733
Iris	35	379	31	18	389

Discussion

Total numbers of naturalized species and transition rates along the invasion process

A previous analysis based on the GloNAF data (van Kleunen et al. 2015) revealed that over 13,000 plant species have become naturalized somewhere on the globe, and identified Europe and North America as the continents with the highest numbers of naturalized alien plants. The study also showed that the traditional global dichotomy of the Old World donating and the New World receiving naturalized plants needs to be reconsidered; rather, the Northern Hemisphere is a major donor of naturalized plants to other parts of the world. These results demonstrated, for the first time at the scale of the whole world, that naturalization processes exhibit clear biogeographic patterns (van Kleunen et al. 2015). In the present paper we found a marginally significantly faster rate of naturalized species accumulation with region area for the New World than for the Old World (see Lonsdale 1999). Nevertheless, this does not contradict the previous finding because a fast rate of species accumulation refers to certain aspects of the regional invasibility (see Pyšek & Jarošík 2005), but reflects neither the species compositions of naturalized floras in the regions analysed (as the relationship we tested was based on species numbers), nor the historical flows of naturalized species among continents as in van Kleunen et al. (2015).

The total number of 13,168 naturalized alien species reported by van Kleunen et al. (2015) means that at least 4% of all currently known vascular plant species on Earth (n = 337,137; The Plant List 2015) have become naturalized outside their natural ranges because of humans. The well-known Tens Rule (Williamson & Fitter 1996, Jeschke et al. 2012), according to which ~10% of the vascular plant species would appear as casuals in the wild, and ~10% of those would naturalize, predicts a global estimate of only 3,371 naturalized plant species, i.e. a large underestimate of the global naturalized alien flora. Even taking into account the more liberal range of proportions of casuals and naturalizations proposed under the Tens Rule (5–20%; Williamson & Fitter 1996), the actual total number of naturalized plant species globally is at the upper limit of the prediction ($337{,}137 \times 0.2 \times 0.2 = 13{,}485$ naturalized plant species; also see Richardson & Pyšek 2006).

Our study also provides some indication of how the next transition in the invasion process, following after the species have reached the naturalization stage, fits the prediction of the Tens Rule, one of the early concepts in invasion ecology to which real data are often compared (e.g. Richardson & Pyšek 2006, Jeschke et al. 2012). After reaching the naturalization stage, the Tens Rule predicts that ~10% species would become pests, i.e. have an impact. Since our definition of invasive species is based on impact (CBD 2000, IUCN 2000) rather than spread (Richardson et al. 2000), it may be considered as roughly corresponding to the pest category used by the original Tens Rule concept (Williamson & Fitter 1996). Interestingly, the rate at which naturalized species numbers increase with area for mainland regions closely corresponds to that predicted by the Tens Rule, while on islands the observed increase is slower than predicted (Fig. 4). Nevertheless, it needs to be kept in mind that the Tens Rule was formulated based on observations of a limited number of data sets and there is no theoretical basis for why exactly 10% of species should reach the next stage of invasion.

Most widespread naturalized alien species

Our data provide the first robust estimate of how widespread the most successful naturalized species are over a very large area of the globe. There are some historical data to compare the most widespread naturalized species with, a remarkable one being a study by Coquillat (1951) resulting from a questionnaire asking several botanists at that time to make lists of the plant species that were globally most widespread based on their expertise. The majority of species identified by this survey were common ruderal taxa of European origin, that were widespread over the globe already in the mid-20th century and therefore many of them are also in the GloNAF top-200 list (Table 2), e.g. *Sonchus oleraceus*, *Capsella bursa-pastoris*, *Chenopodium album*, *Plantago major* and *Poa annua*. The absence from the list of Coquillat (1951) of some presently very widespread aliens with an origin in regions outside Europe (e.g. *Ricinus communis*, *Eleusine indica*, *Mirabilis jalapa*) may be due to geographical expertise of researchers approached for Coquillat's study, or because these species have spread particularly rapidly during the last decades.

There is a markedly greater representation of annuals and disproportionally fewer shrubs and trees amongst the most widespread naturalized aliens. This can be related to a greater dispersal ability and rates of spread of annuals that are related to their broader overall distribution (Forcella 1985, Pyšek & Hulme 2005). Annuals might also be less limited by climate, such as cold winters and drought periods, as they can finish their short life cycle in a few months. The short generation time and some typical traits such as ability to form seed banks (Gioria et al. 2012, Gioria & Pyšek 2016, Milakovic & Karrer 2016), together with their affinity to anthropogenic habitats where they easily colonize and establish, likely contribute to the faster spread of annuals compared with woody perennials (Berg et al. 2016). The lag times for trees and shrubs following introduction to a new region are on the scales of decades to centuries (Kowarik 1995). Another factor contributing to this pattern is that the introduction pathway for annuals is often crop contamination as weeds (e.g. Wilson et al. 2016), that then proliferate in regions where naturalized owing to human disturbance through agriculture.

Naturalized and invasive species

It needs to be borne in mind that compared to the classification of species as 'naturalized', labelling a species as 'invasive' often needs to be taken with caution because the criteria for the latter are less distinct (Catford et al. 2016). The main criterion for classifying a species as naturalized, i.e. the fact that it reproduces in the wild and forms self-sustaining populations (Richardson et al. 2000, Blackburn et al. 2011), is a qualitative one, and more or less binary (the species is either naturalized or not), hence it is easier to apply and some studies even distinguish between casual and naturalized populations of the same species (Essl et al. 2009). However, the criteria for considering a species invasive differ even between ecologists on one side and conservationists, managers and policy makers on the other (CBD 2000, IUCN 2000). The ecological criteria for invasiveness based on the rate of spread are quantitative, representing rather a continuum (Richardson & Pyšek 2006), and this trait is extremely difficult to measure (Pyšek & Hulme 2005). Therefore the likelihood that the species that behaves the same in two regions will be categorized differently by different researchers is greater for invasive than for naturalized status.

In this paper, we used the IUCN (2000) definition of invasiveness, which is related to species' impacts rather than the purely ecological one based on spread (Richardson et al. 2000, Blackburn et al. 2011). The reason for this decision was to increase comparability of the data from different regions. The IUCN definition is reflected in a major database of the most problematic invasive species, the ISSG Global Invasive Species Database (Pagad et al. 2016), for which the data are standardized. Unfortunately, no systematic standardization of the term 'invasive' based on the latter ecological definition exists for global regions, therefore the reasons for designating species as invasive vary regionally. Evaluation of alien species in terms of their regional invasiveness is not included even in some authoritative continental databases such as DAISIE (2009) or BONAP (Kartesz 2015). The data we provide here therefore represent the most comprehensive published account of regional richness of invasive species to date (Appendix 1) with impact on semi(natural) communities, and may serve as a baseline and stimulus for elaborating a global picture of invasiveness based on ecological criteria such as the dynamics of spread (Richardson et al. 2000).

We found a strong correlation between the numbers of invasive (sensu CBD 2000, IUCN 2000) and all naturalized taxa (sensu Richardson et al. 2000, Blackburn et al. 2011), which is an important message from the prediction point of view. This means that the regions labelled as invasion hotspots correspond to those identified as regions with the greatest occurrence of naturalized species. This has been previously reported by Rejmánek & Randall (2004) who showed that the number of naturalized species in US states is a reliable predictor of the number of species considered as pests, and by Chytrý et al. (2009a) for Europe where regions with many alien species also had more invasive species. The evidence we present here suggests that the relationship is generally valid globally, and can have important implications for management, because even without having good information on the number of invasive species, areas with many naturalized aliens can be identified as having a high risk of being invaded. On the other hand, the importance of data quality issues cannot be underestimated because using naturalized alien species as an indicator of invasiveness in regions where they are poorly recorded might result in underestimating the invasion risk.

Differences in the composition of naturalized floras between mainland and island regions

In the present paper we provide the most robust evidence so far that some plant families have disproportionally high or low representation of naturalized species, and that such families are distributed non-randomly over the phylogeny; previous research from the late 1990s reported a high concentration of 'invasive families' in subclasses such as *Commelinidae*, *Alismatidae* (Daehler 1998), *Caryophyllidae* and *Asteridae* (Pyšek 1998). The fact that some families are over-represented on islands and others in mainland regions can possibly be related to their evolutionary centres of diversity. The representatives of the former group, such as *Arecaceae*, *Araceae*, *Acanthaceae*, *Amaryllidaceae*, *Asparagaceae*, *Convolvulaceae* or *Rubiaceae*, have their centres of diversity in the tropics (Mabberley 2008), and many of the islands in our data sets are tropical or subtropical. This might serve as an explanation for the differences between islands and mainland regions at the higher taxonomic levels, and is further supported by the fact that fewer families appear to contain disproportionally more naturalized alien species in mainland than island regions, and those that do, are large families with centres of diversity in temperate regions, such as *Brassicaceae*, *Caryophyllaceae* and *Boraginaceae* (Mabberley 2008). Regarding species that are over-represented in one of the region types, there is an interesting dichotomy. Many of the mainly mainland species are agricultural weeds that have been mostly introduced accidentally while many species over-represented on islands are woody, edible fruit-producing taxa, or with some other amenity value, i.e. deliberately introduced.

Another striking difference that we found when analysing island and mainland naturalized floras from the life-history perspective was that islands harbour 17% more woody species (they contribute 34% on islands but below 30% on mainland) and 16% fewer annual forbs (19% and 22%, respectively). This result is in accordance with expected under-representation of native woody plants on islands, related to their low dispersal ability compared to other life forms (König et al. 2017). These authors, in their global analysis of native floras based on 150,000 vascular plant species, showed that the ability to pass ecological filters depends on species attributes such as dispersal ability or environmental tolerance that are reflected by group-specific turnover patterns (defined as the amount of change in species identities among study sites). They reported lowest turnover rates for pteridophytes, intermediate for angiosperms, gymnosperms and herbs, and highest for trees and shrubs (König et al. 2017).

Factors shaping the richness of naturalized floras

Some of the results presented in this paper confirm previously reported phenomena, such as the greater vulnerability of islands to invasions by naturalized plants (van Kleunen et al. 2015), illustrated here by the number of naturalized species on islands increasing with the number of native species at a faster rate than in mainland regions. However, the opposite is true for the increase of invasive species number with that of naturalized – one explanation may be that because there are so many successfully naturalized species on islands, the sampling effect is less pronounced when it comes to transition towards invasive species. The analysis using regression trees revealed that it is mainly geography that shapes the levels of naturalization on islands, with greater distance to continental landmasses as a proxy for evolutionary isolation resulting in more naturalizations, and greater altitudinal range, representing a greater niche availability, and location in Southern Hemisphere increasing the levels of naturalization on islands that are closer to the mainland.

The same analysis for mainland regions points to biogeography as the main predictor of the levels of naturalization; temperate and mediterranean areas tend to be more invaded, and the pattern is further shaped by socioeconomic factors. Using per-capita GDP as the major socioeconomic factor, correlated with many others (Pyšek et al. 2010), suggests that the level of naturalization only increases with GDP to some threshold after which it is reduced, and that there thus might be an optimum range of socioeconomic influence favouring the presence of naturalized plants. We can speculate that disturbances, an important factor in invasion (Hobbs & Huenneke 1992) cease to support naturalization if they become too severe above a certain threshold, or that the most developed economies allocate more resources to biosecurity, which would be supported by the fact that many of the less invaded regions by naturalized plants that were above the threshold GDP were in Australia.

The GloNAF database: a key resource for better understanding of global invasions

As pointed out by Joppa et al. (2016), progress in the implementation of very large and complex biodiversity data sets is essential to prevent the impacts caused by invasive alien species on biodiversity and on human livelihood. Therefore, it is important to improve the mobilization of the available data both for sustainable development and for environmental protection. The outcomes of this study illustrate how the progress in the compilation and evaluation of global data on alien plants can significantly increase our understanding of invasion patterns. Besides providing the first robust estimates of variation in the numbers of naturalized plant species worldwide, the GloNAF database is a unique data source for testing various hypotheses about invasion mechanisms. It has the potential to become one of the key tools for better understanding and predicting plant invasions globally. Compared to some widely used resources on species distributions, such as GBIF (2014), GloNAF allows for more rigorous testing of issues related to invasions because of the thorough evaluation of alien species status during data acquisition and collation (van Kleunen et al. 2015). Yet, an improvement of global data on alien species could be achieved through merging GloNAF information with GBIF, which is the largest data source for point localities of species distributions. So far the majority of GBIF data lack information on species native vs alien status, information present in GloNAF. Conversely, GloNAF could profit from increasing its coverage by using GBIF point data for regions from where there is no systematic record of aliens.

As illustrated by Hulme & Weser (2011), any overview of plant invasion patterns can only be as good as the databases behind it, and depends on the consistent treatment of species status, survey effort and taxonomic coverage. In their comparison of the two major European databases, DAISIE and NOBANIS, these authors found that alien species richness, cross-taxon correlations and the significance of individual drivers of invasion were all strongly database dependent, but the differences were more marked for the total numbers of all aliens than for naturalized aliens. Also, in many cases the major difficulty is not data accessibility but its subsequent integration and standardization (Crall et al. 2006, Hulme & Weser 2011). This points to naturalization as the crucial stage of the invasion process, which should be paid most attention, not only because it is the most rigorously defined of all invasion stages but also because invasive species recruit from naturalized species (Richardson & Pyšek 2012).

It needs to be noted that the GloNAF database analysed here represents the state of the art in a field addressing one of the most dynamic phenomena in ecology. Despite every attempt to track the best data sources (Electronic Appendix 1) and follow the definition of 'naturalized' as rigorously as data allowed, a database comprising ~175,000 taxon-by-region records is bound to vary in data quality and cannot be free of errors. However, the data presented in this paper should be understood as a comprehensive summary pointing also to gaps, how the data can be improved and where they should be primarily collected, reflecting regional differences (see Latombe et al. 2017). One politically relevant and important application of global data sets on alien species is the development of indicators, which is currently under way for alien species as part of the GEOBON network (Latombe et al. 2017). Gathering information on absolute numbers and proportions and if possible on the dynamics of alien species (see Seebens et al. 2017) will form a solid baseline for any indicator development with a temporal perspective.

GloNAF already now can be used for designing concerted action to fill data gaps, and to allocate resources most efficiently towards better understanding and management of plant invasions worldwide. To achieve this aim, we recommend that global data providers work in synergy to improve the standard of the data made available and increase connections among existing databases, to increase knowledge and empower more effective policies at all scales.

See www.preslia.cz for Electronic Appendices 1–3

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Souhrn

V článku, založeném na datech z nedávno vytvořené databáze GloNAF (akronym pro Global Naturalized Alien Flora), jež obsahuje informace o rozšíření nepůvodních naturalizovaných druhů rostlin ve 483 pevninských regionech a na 361 ostrovech, jsou popsány globální zákonitosti geografického rozšíření naturalizovaných flór, jejich taxonomické a fylogenetické složení a faktory určující rozdíly v druhové bohatosti mezi pevninou a ostrovy. Mezi pevninské oblasti s největším počtem naturalizovaných druhů patří některé australské státy (především New South Wales) a několik severoamerických (mezi nimiž Kalifornie se 1753 taxony představuje vůbec nejbohatší oblast); Anglie, Japonsko, Nový Zéland a Havajské soustroví představují druhově nejbohatší ostrovní oblasti. Regiony s největším počtem naturalizovaných druhů vesměs tvoří také tzv. 'hotspots' světových invazí, vyjádřeno procentuálním podílem těchto druhů na celkové flóře dané oblasti. Najdeme je na západě i východě Severní Ameriky, v severozápadní Evropě, jižní Africe, jihovýchodní Austrálii, Novém Zélandu a části Indie; pokud jde o ostrovy, představuje hotspots především oblast Tichého oceánu. Počty naturalizovaných druhů těsně korelují s bohatostí původních flór, přičemž na ostrovech je korelace těsnější a nárůst rychlejší, což potvrzuje větší náchylnost ostrovů k invazím. Jižní Afrika, Indie, Kalifornie, Kuba, Florida, australský stát Queensland a Japonsko jsou státy s nejvyšším udávaným počtem invazních druhů (tedy těch naturalizovaných druhů, které se rychle šíří). Oblasti temperátního zonobiomu hostí nejvíce naturalizovaných taxonů (9036), následují zonobiom tropický (6774), mediteránní (3280), subtropický (3057) a arktický (321). V Novém světě je zaznamenáno více naturalizovaných taxonů (9905) než ve Starém světě (7923) a tento rozdíl je marginálně průkazný, použijeme-li jako míru nárůst počtu druhů s plochou. Vzdálenost k nejbližší pevnině, odrážející izolovanost ostrova, je nejdůležitějším faktorem určujícím míru invaze naturalizovanými rostlinami na ostrovech, v pevninských oblastech má rozhodující vliv klima spojené s příslušností k zonobiomu a sociekonomické faktory, reprezentované hrubým domácím produktem. Každý z 11 nejrozšířenějších druhů zdomácněl přinejmenším ve třetině z celkového počtu podchycených regionů; nejrozšířenější z nich, *Sonchus oleraceus*, se vyskytuje ve 48 % regionů, které dohromady pokrývají 42 % zemského povrchu. Dalšími široce rozšířenými druhy jsou *Ricinus communis*, *Oxalis corniculata*, *Portulaca oleracea*, *Eleusine indica*, *Chenopodium album*, *Capsella bursa-pastoris*, *Stellaria media*, *Bidens pilosa*, *Datura stramonium* a *Echinochloa crus-galli*. Mezi druhy, které jsou v celosvětovém měřítku nejčastěji invazní, patří *Lantana camara* (druh je zaznamenán ve 120 regionech z 349, pro které je k dispozici klasifikace invazních druhů), *Calotropis procera* (118), *Eichhornia*

crassipes (113), *Sonchus oleraceus* (108) a *Leucaena leucocephala* (103). Pokud jde o zastoupení životních forem, na ostrovech je relativně více naturalizovaných dřevin (34,4 %), než na pevnině (29,5 %), a méně jednoletých taxonů (18,7 % ve srovnání s 22,3 %). Nejvíce naturalizovaných taxonů patří do čeledí *Compositae* (1343), *Poaceae* (1267) a *Leguminosae* (1189). Zdomácnělí zástupci některých čeledí (*Arecaceae*, *Araceae*, *Acanthaceae*, *Amaryllidaceae*, *Asparagaceae*, *Convolvulaceae*, *Rubiaceae*, *Malvaceae*) jsou vázáni spíše na ostrovy, čeledí s relativně vyšším výskytem na pevnině je méně (např. *Brassicaceae*, *Caryophyllaceae*, *Boraginaceae*). Vztáhneme-li počty naturalizovaných taxonů k celkové druhové bohatosti dané čeledi, ukazuje se, že některé velké čeledi zahrnují více takových zástupců, než by odpovídalo náhodě (např. *Poaceae*, *Leguminosae*, *Rosaceae*, *Amaranthaceae*, *Pinaceae*), jiné jsou podhodnoceny (např. *Euphorbiaceae*, *Rubiaceae*) a čeleď nejbohatší na naturalizované taxony, *Compositae*, dosahuje hodnot odpovídajících její globální druhové bohatosti. Analýza fylogenetického postavení čeledí s ohledem na zastoupení naturalizovaných zástupců odhalila, že čeledi se zvýšeným naturalizačním potenciálem nejsou z hlediska příbuznosti rozmístěny náhodně a tento fylogenetický signál je statisticky průkazný ($P = 0.0341$). *Solanum* (112 taxonů), *Euphorbia* (108) a *Carex* (106) obsahují nejvíce naturalizovaných taxonů. Rody *Cotoneaster*, *Juncus*, *Eucalyptus*, *Salix*, *Hypericum*, *Geranium* a *Persicaria* jsou relativně zastoupenější na ostrovech, pro pevninské oblasti jsou typické naturalizované taxony rodů *Atriplex*, *Opuntia*, *Oenothera*, *Artemisia*, *Vicia*, *Galium* a *Rosa*. Data představená v článku ukazují také na mezery v současných znalostech a umožňují vymezit oblasti, kam by bylo užitečné napřít úsilí a chybějící informace získat.

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Appendix 1. – Regions included in the GloNAF 1.1 database, with TDWG continent to which it belongs, whether the region is mainland or island indicated (Main/Isl), and the zonobiome (I. Tropical (equatorial); II. Tropical (savanna); III. Subtropical (arid); IV. Mediterranean; V. Warm temperate; VI. Temperate (nemoral); VII. Arid (temperate), Continental; VIII. Cold temperate (boreal); IX. Arctic, based on Walter & Breckle 1991). Information is provided on the number of native species; the total number of naturalized alien species and their percentage in the total flora of the region; and number of invasive species (empty cells indicate that the data is not available). The numbers of the naturalized species correspond to van Kleunen et al. (2015) but include updated species numbers in some cases where new data appeared. See text for details on collating the numbers of invasive species. Within mainland and islands, the regions are listed by TDWG continents, and within them alphabetically by countries and subregions. See Table 2 for the numbers of regions for which the data are available in particular continents. The complete set of the 1013 regions for which the data were gathered is presented, including some overlapping regions. Only non-overlapping regions, marked with * in the NO column were used in analyses (n = 844). Data sources for species numbers are given in Electronic Appendix 1 together with additional geographic information on regions (area, coordinates, hemisphere and Old/New world location). Note that in the previous analysis of the historical dynamics of naturalized species exchange and accumulation across the globe (van Kleunen et al. 2015) based on the same data, there were 843 regions compared to 844 used here. This is because in the present paper the data on Baja California and Baja California Sur, merged in van Kleunen et al. (2015), are treated separately.

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
Algeria		*	328	7.7	38	3953	Africa	main	IV
Angola		*	227	4.2	2	5185	Africa	main	II
Benin		*	333	11.4	9	2584	Africa	main	I
Botswana		*	170	5.3	51	3041	Africa	main	III
Burkina Faso		*	149	7.2	6	1918	Africa	main	II
Burundi		*	187	6.0	2	2909	Africa	main	II
Cameroon		*	296	3.6	10	7850	Africa	main	I
Central African Republic		*	57	1.6	2	3602	Africa	main	II
Congo		*	56	1.2	8	4538	Africa	main	I
Cote d'Ivoire		*	266	6.5	9	3853	Africa	main	I
Democratic Republic of the Congo		*	522	4.5	10	11007	Africa	main	I
Djibouti		*	42	6.1	1	641	Africa	main	III
Egypt		*	179	8.7	33	1890	Africa	main	III
Equatorial Guinea		*	187	5.4	1	3250	Africa	main	I
Eritrea		*	65	8.5	6	700	Africa	main	III
Ethiopia		*	421	6.0	16	6603	Africa	main	II
Gabon		*	94	1.4	2	6651	Africa	main	I
Gambia			11	1.1	5	974	Africa	main	II
Ghana		*	190	6.0	16	2974	Africa	main	I
Guinea		*	86	2.8	8	3007	Africa	main	I
Guinea Bissau			97	6.2	3	1459	Africa	main	I
Guinea Bissau	East region	*	27				Africa	main	I
Guinea Bissau	North region	*	40				Africa	main	I
Guinea Bissau	South region	*	30				Africa	main	I
Chad		*	274	11.6	6	2080	Africa	main	III
Kenya		*	145	2.2	39	6506	Africa	main	II
Lesotho		*	206	6.4	2	3000	Africa	main	II
Liberia		*	141	6.0	4	2200	Africa	main	I
Lybia		*	147	7.5	2	1825	Africa	main	III
Malawi		*	50	1.3	9	3765	Africa	main	II
Mali		*	74	4.1	7	1741	Africa	main	III
Mauritania		*	84	7.5	3	1040	Africa	main	III
Morocco		*	410	8.0	8	4700	Africa	main	IV
Mozambique			103	1.8	25	5692	Africa	main	II
Mozambique	Cabo Delgado	*	19				Africa	main	I
Mozambique	Gaza	*	102				Africa	main	I
Mozambique	Inhambane	*	44				Africa	main	I
Mozambique	Manica	*	105				Africa	main	I
Mozambique	Maputo	*	396				Africa	main	I
Mozambique	Nampula	*	44				Africa	main	I
Mozambique	Nassa	*	91				Africa	main	I
Mozambique	Sofala	*	93				Africa	main	I
Mozambique	Tete	*	80				Africa	main	I
Mozambique	Zambezia	*	56				Africa	main	I
Namibia		*	218	4.8	58	4300	Africa	main	III
Niger		*	37	2.5	7	1460	Africa	main	III
Nigeria		*	193	3.9	19	4715	Africa	main	I
Rwanda		*	229	8.4	6	2500	Africa	main	II
Senegal		*	97	3.7	9	2500	Africa	main	II
Sierra Leone		*	76	3.5	2	2090	Africa	main	I
Somalia		*	63	2.0	5	3028	Africa	main	III
South Africa			1040	4.8	374	20447	Africa	main	several
South Africa	Eastern Cape	*	601	7.4		7525	Africa	main	II
South Africa	Gauteng	*	443	14.6		2584	Africa	main	II
South Africa	KwaZulu-Natal	*	610	7.9		7122	Africa	main	II

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
South Africa	Limpopo	*	372	7.1		4866	Africa	main	II
South Africa	Mpumalanga	*	450	7.9		5275	Africa	main	II
South Africa	North West	*	302	11.4		2354	Africa	main	II
South Africa	Northern Cape	*	265	4.6		5517	Africa	main	III
South Africa	Orange Free State	*	342	9.9		3096	Africa	main	II
South Africa	Western Cape	*	551	29.2		1337	Africa	main	IV
Sudan		*	59	1.8	9	3156	Africa	main	III
Swaziland		*	315	10.4	10	2715	Africa	main	II
Tanzania		*	157	1.5	28	10008	Africa	main	II
Togo		*	63	2.1	3	3003	Africa	main	I
Tunisia		*	225	5.9	8	3573	Africa	main	IV
Uganda		*	152	3.0	25	4848	Africa	main	II
Western Sahara			1				Africa	main	III
Zambia			84	1.3	13	6280	Africa	main	II
Zambia	Central	*	36				Africa	main	I
Zambia	Copperbelt	*	43				Africa	main	I
Zambia	Eastern	*	52				Africa	main	I
Zambia	Luapula	*	20				Africa	main	I
Zambia	Lusaka	*	77				Africa	main	I
Zambia	Northern	*	67				Africa	main	I
Zambia	North-western	*	34				Africa	main	I
Zambia	Southern	*	67				Africa	main	I
Zambia	Western	*	32				Africa	main	I
Zimbabwe			238	3.9	27	5930	Africa	main	II
Zimbabwe	Central region	*	195		77		Africa	main	II
Zimbabwe	Eastern region	*	191		75		Africa	main	II
Zimbabwe	Northern region	*	109		56		Africa	main	II
Zimbabwe	Southern region	*	94		55		Africa	main	II
Zimbabwe	Western region	*	117		58		Africa	main	II
Antarctica		*	2	50.0	0	2	Antarctica	main	IX
Afghanistan			47	0.9	19	5000	Asia-temp	main	III
Armenia			389	9.9	20	3553	Asia-temp	main	VI
Azerbaijan					4	4300	Asia-temp	main	VII
Azerbaijan	Talysh		91	6.5		1314	Asia-temp	main	VI
Bahrain					1	195	Asia-temp	main	III
Bhutan					4	5446	Asia-temp	main	II
Georgia		*	148	3.7	20	3884	Asia-temp	main	VI
China	Anhui	*	184	6.9	58	2500	Asia-temp	main	V
China	Beijing	*	123	8.4	57	1349	Asia-temp	main	VI
China	Chongqing	*	58	1.4		4231	Asia-temp	main	V
China	Fujian	*	312	8.6	89	3328	Asia-temp	main	V
China	Gansu	*	148	4.3		3315	Asia-temp	main	VI
China	Guangdong	*	387	7.4	97	4846	Asia-temp	main	V
China	Guangxi	*	303	9.2	82	3000	Asia-temp	main	I
China	Guizhou	*	227	4.1	68	5288	Asia-temp	main	V
China	Hebei	*	193	9.1	53	1937	Asia-temp	main	VI
China	Heilongjiang	*	151	8.1	38	1711	Asia-temp	main	VIII
China	Henan	*	171	5.4	49	2987	Asia-temp	main	VI
China	Hongkong	*	167	7.0	60	2228	Asia-temp	main	V
China	Hubei	*	196	4.8	56	3911	Asia-temp	main	V
China	Hunan	*	201	5.0	56	3857	Asia-temp	main	V
China	Jiangsu	*	234	12.7	66	1606	Asia-temp	main	V
China	Jiangxi	*	212	6.6	62	3021	Asia-temp	main	V
China	Jilin	*	134	7.3		1698	Asia-temp	main	VI
China	Liaoning	*	155	9.5		1485	Asia-temp	main	VI

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
China	Macau	*	83	13.7		523	Asia-temp	main	V
China	Nei Mongol	*	145	6.3		2142	Asia-temp	main	VII
China	Ningxia Hui	*	109	7.9	17	1270	Asia-temp	main	VI
China	Qinghai	*	118	4.3	23	2614	Asia-temp	main	VI
China	Shaanxi	*	164	4.7	35	3318	Asia-temp	main	VI
China	Shandong	*	176	12.6	52	1219	Asia-temp	main	VI
China	Shanghai	*	94	15.8	36	500	Asia-temp	main	V
China	Shanxi	*	137	7.0		1830	Asia-temp	main	VI
China	Sichuan	*	250	2.8	73	8722	Asia-temp	main	V
China	Tianjin	*	86	10.1	24	768	Asia-temp	main	VI
China	Xinjiang Uygur	*	161	4.4	34	3494	Asia-temp	main	VII
China	Xizang	*	151	2.4	3	6106	Asia-temp	main	VI
China	Yunnan	*	395	2.8	98	13528	Asia-temp	main	V
China	Zhejiang	*	229	7.4	76	2847	Asia-temp	main	V
Iran			79	1.0	13	8200	Asia-temp	main	III
Iraq					10	3300	Asia-temp	main	III
Israel		*	167	5.7	69	2750	Asia-temp	main	IV
Jordan					4	2100	Asia-temp	main	III
Kazakhstan					2	6000	Asia-temp	main	VII
Kazakhstan	Aral Caspian		51	3.7		1313	Asia-temp	main	VII
Kazakhstan	Dzungeria Tarbatagai		53	3.4		1499	Asia-temp	main	VII
Kazakhstan	Lake Balkhash Area		56	3.5		1555	Asia-temp	main	VII
Kyrgyzstan		*	74	1.9		3869	Asia-temp	main	VII
Lebanon					2	2790	Asia-temp	main	IV
Mongolia			39	1.3	1	3000	Asia-temp	main	VII
North Korea		*	71	2.4	18	2898	Asia-temp	main	VI
Oman		*	40	3.2	6	1204	Asia-temp	main	III
Qatar		*	127	32.0	1	270	Asia-temp	main	III
Russia			1203	8.8	159	12500	Asia-temp	main	several
Russia	boreal subregion		71	4.3		1586	Asia-temp	main	VIII
Russia	Altai Republic	*	37	1.9	2	1963	Asia-temp	main	VIII
Russia	Amur Region		127	8.0		1469	Asia-temp	main	VIII
Russia	Anadyr		3	0.9		344	Asia-temp	main	IX
Russia	Arctic Siberia		0			397	Asia-temp	main	IX
Russia	Buryat	*	41	2.0	1	2043	Asia-temp	main	VIII
Russia	Chukotka		3	0.9		323	Asia-temp	main	IX
Russia	Ciscaucasia		124	4.5		2621	Asia-temp	main	VI
Russia	Dagestan		99	4.8		1947	Asia-temp	main	VI
Russia	Irkutsk	*	59	3.1	3	1837	Asia-temp	main	VIII
Russia	Kamchatka		16	2.1		751	Asia-temp	main	VIII
Russia	Kemerovo	*	75	6.0	2	1165	Asia-temp	main	VIII
Russia	Khabarovsk	*	401				Asia-temp	main	VIII
Russia	Khakass	*	26	1.7	1	1525	Asia-temp	main	VIII
Russia	Kolyvan Tomsk Plateai east reg.		236				Asia-temp	main	VIII
Russia	Kolyvan Tomsk Plateai west reg.		110				Asia-temp	main	VIII
Russia	Krasnoyarsk Krai	*	67	2.9	0	2244	Asia-temp	main	VIII
Russia	Kuznetsk Alatau east region		37				Asia-temp	main	VIII
Russia	Kuznetsk Alatau north region		51				Asia-temp	main	VIII
Russia	Kuznetsk Alatau west region		36				Asia-temp	main	VIII
Russia	Kuznetsk Depression		155				Asia-temp	main	VIII
Russia	Lena Kolyma		22	2.2		985	Asia-temp	main	IX
Russia	Magadan region	*	222	17.6		1037	Asia-temp	main	VIII
Russia	Mountain Shoriya Gerneya Shoria		69				Asia-temp	main	VIII
Russia	Nazarov Minusinsk Hollow		64				Asia-temp	main	VIII
Russia	Nord Altai		86				Asia-temp	main	VIII

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
Russia	North east Preteletsk Altai		73				Asia-temp	main	VIII
Russia	North west Altai		175				Asia-temp	main	VIII
Russia	Novosibirsk	*	44	3.6	1	1168	Asia-temp	main	VIII
Russia	Omsk	*	72	6.7	2	1007	Asia-temp	main	VIII
Russia	Republic of Tyva	*	17	0.9	0	1867	Asia-temp	main	VIII
Russia	Salair		86				Asia-temp	main	VIII
Russia	Tomsk	*	60	5.7	1	986	Asia-temp	main	VIII
Russia	Ussuri		59	3.8		1501	Asia-temp	main	VI
Russia	West Altai		109				Asia-temp	main	VIII
Russia	Zabaykalsky Krai	*	22	1.3	1	1735	Asia-temp	main	VIII
Saudi Arabia		*	50	2.2	10	2253	Asia-temp	main	III
South Korea		*	270	5.5		4662	Asia-temp	main	VI
Supranational reg.	Altai	*	71	3.6	6	1884	Asia-temp	main	VIII
Supranational reg.	Amu Darya Foothills		44	6.5		638	Asia-temp	main	VII
Supranational reg.	Eastern Transcaucasia		143	4.3		3178	Asia-temp	main	VI
Supranational reg.	Irtysh		48	3.3		1428	Asia-temp	main	VIII
Supranational reg.	Kazyl Kum		33	4.3		731	Asia-temp	main	VII
Supranational reg.	Lower Volga		89	6.3		1328	Asia-temp	main	VII
Supranational reg.	Pamir Altai		81	2.5		3176	Asia-temp	main	VIII
Supranational reg.	Southern Transcaucasia		116	4.0		2758	Asia-temp	main	VI
Supranational reg.	Syr Darya Foothills		65	5.1		1201	Asia-temp	main	VII
Supranational reg.	Tien shan		77	2.8		2693	Asia-temp	main	VII
Supranational reg.	Upper Tobol		81	5.7		1349	Asia-temp	main	VIII
Syria					7	3110	Asia-temp	main	IV
Tajikistan					1	4550	Asia-temp	main	VII
Turkey			356	3.8	23	8988	Asia-temp	main	IV
Turkmenistan					1	3000	Asia-temp	main	VII
Turkmenistan	Kara Kum		36	4.5		766	Asia-temp	main	VII
Turkmenistan	Montane Turkmenistan		71	4.4		1532	Asia-temp	main	VII
United Arab Emirates					4	678	Asia-temp	main	III
Yemen		*	62	2.4	8	2559	Asia-temp	main	III
Bangladesh					19	5000	Asia-trop	main	II
Cambodia					29	2308	Asia-trop	main	II
India			730	3.8	352	18664	Asia-trop	main	II
India	Andhra Pradesh	*	323		10		Asia-trop	main	II
India	Arunachal Pradesh	*	282	6.5	14	4055	Asia-trop	main	II
India	Assam	*	297		17		Asia-trop	main	II
India	Bihar	*	288		8		Asia-trop	main	II
India	Chandigarh	*	251		6		Asia-trop	main	II
India	Chhattisgarh	*	239		2		Asia-trop	main	II
India	Delhi	*	277	34.3	7	531	Asia-trop	main	II
India	Goa	*	270		7		Asia-trop	main	II
India	Gujarat	*	292	14.0	8	1800	Asia-trop	main	II
India	Haryana	*	283		5		Asia-trop	main	II
India	Himachal Pradesh	*	340	22.0	18	1202	Asia-trop	main	II
India	Jammu and Kashmir	*	339		20		Asia-trop	main	II
India	Jharkhand	*	238		1		Asia-trop	main	II
India	Karnataka	*	376	9.9	11	3410	Asia-trop	main	II
India	Kerala	*	374		7		Asia-trop	main	II
India	Madhya Pradesh	*	287	25.2	6	852	Asia-trop	main	II
India	Maharashtra	*	352		8		Asia-trop	main	II
India	Manipur	*	259	10.6	14	2191	Asia-trop	main	II
India	Meghalaya	*	276		15		Asia-trop	main	II
India	Mizoram	*	251		12		Asia-trop	main	II
India	Nagaland	*	260		16		Asia-trop	main	II

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
India	Orissa	*	283	10.0	6	2561	Asia-trop	main	II
India	Puducherry	*	265				Asia-trop	main	II
India	Punjab	*	307	21.5	6	1119	Asia-trop	main	II
India	Rajasthan	*	321	30.0	5	750	Asia-trop	main	II
India	Sikkim	*	302	6.6	15	4250	Asia-trop	main	II
India	Tamil Nadu	*	439	18.0	12	2000	Asia-trop	main	II
India	Tripura	*	256		14		Asia-trop	main	II
India	Uttar Pradesh	*	316		15		Asia-trop	main	II
India	Uttaranchal	*	337		12		Asia-trop	main	II
India	West Bengal	*	350		14		Asia-trop	main	II
Laos		*	204	4.0	5	4850	Asia-trop	main	II
Malaysia					31	15000	Asia-trop	main	I
Malaysia	Malaysia Peninsula	*	218	2.6	36	8070	Asia-trop	main	I
Myanmar					17	7000	Asia-trop	main	II
Nepal		*	154	2.2	18	6973	Asia-trop	main	II
Pakistan			439	6.8	71	6000	Asia-trop	main	III
Thailand		*	252	2.1	35	11625	Asia-trop	main	II
Vietnam					39	13700	Asia-trop	main	II
Australia	Australia Victoria	*	1269	31.4	84	2773	Australasia	main	V
Australia	Avon Wheatbelt	*	380	6.5		5463	Australasia	main	IV
Australia	Burke	*	207	8.8		2133	Australasia	main	II
Australia	Burnett	*	403	18.0		1837	Australasia	main	II
Australia	Carnarvon	*	132	6.8		1810	Australasia	main	IV
Australia	Central Coast	*	1045	30.6		2374	Australasia	main	II
Australia	Central Kimberley	*	71	4.4		1549	Australasia	main	III
Australia	Central Ranges	*	8	1.1		751	Australasia	main	III
Australia	Central Tablelands	*	622	22.9		2090	Australasia	main	II
Australia	Central Western Slopes	*	596	24.8		1811	Australasia	main	II
Australia	Cook	*	684	12.4		4846	Australasia	main	I
Australia	Coolgardie	*	172	5.5		2971	Australasia	main	IV
Australia	Dampierland	*	120	6.6		1710	Australasia	main	III
Australia	Darling Downs	*	589	19.8		2385	Australasia	main	II
Australia	Eastern	*	153	14.6		898	Australasia	main	III
Australia	Esperance Plains	*	316	7.0		4209	Australasia	main	IV
Australia	Eyre Peninsula	*	464	21.3		1712	Australasia	main	III
Australia	Flinders Ranges	*	360	20.7		1380	Australasia	main	III
Australia	Gairdner-Torrens	*	126	11.4		979	Australasia	main	III
Australia	Gascoyne	*	29	1.9		1532	Australasia	main	III
Australia	Geraldton Sandplains	*	299	7.3		3825	Australasia	main	IV
Australia	Gibson Desert	*	4	0.6		668	Australasia	main	III
Australia	Great Sandy Desert	*	9	1.0		888	Australasia	main	III
Australia	Great Victoria Desert	*	9	0.9		996	Australasia	main	III
Australia	Gregory North	*	76	6.3		1137	Australasia	main	II
Australia	Gregory South	*	69	7.7		830	Australasia	main	II
Australia	Hampton	*	36	9.2		357	Australasia	main	III
Australia	Jarrah Forest	*	648	10.8		5353	Australasia	main	IV
Australia	Lake Eyre	*	124	9.3		1213	Australasia	main	III
Australia	Leichhardt	*	365	14.1		2222	Australasia	main	II
Australia	Little Sandy Desert	*	10	0.9		1048	Australasia	main	III
Australia	Mallee	*	214	5.3		3816	Australasia	main	IV
Australia	Maranoa	*	246	14.2		1485	Australasia	main	II
Australia	Mitchell	*	190	10.7		1585	Australasia	main	II
Australia	Moreton	*	936	25.0		2802	Australasia	main	II
Australia	Murchison	*	95	3.9		2364	Australasia	main	III
Australia	Murray	*	554	26.5		1537	Australasia	main	III

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
Australia	New South Wales		1584	25.3	145	4677	Australasia	main	V
Australia	North Coast	*	915	23.8		2928	Australasia	main	II
Australia	North Far Western Plains	*	490	32.2		1030	Australasia	main	III
Australia	North Kennedy	*	561	13.7		3548	Australasia	main	II
Australia	North Western Plains	*	370	19.7		1508	Australasia	main	III
Australia	North Western Slopes	*	584	26.7		1607	Australasia	main	II
Australia	Northern Kimberley	*	122	5.1		2267	Australasia	main	III
Australia	Northern Lofty	*	545	32.8		1118	Australasia	main	III
Australia	Northern Tablelands	*	446	18.6		1948	Australasia	main	II
Australia	Northern Territory	*	398	10.8	72	3293	Australasia	main	III
Australia	North-Western	*	55	4.7		1108	Australasia	main	III
Australia	Nullarbor (Western Australia)	*	52	8.8		539	Australasia	main	III
Australia	Nullarbor (Southern Australia)	*	81	11.9		602	Australasia	main	III
Australia	Ord Victoria Plain	*	50	4.4		1099	Australasia	main	III
Australia	Pilbara	*	81	3.9		1970	Australasia	main	III
Australia	Port Curtis	*	500	17.3		2387	Australasia	main	II
Australia	Queensland		1316	14.1	165	8005	Australasia	main	II
Australia	South Australia		1267	27.0	71	3418	Australasia	main	III
Australia	South Coast	*	423	18.5		1868	Australasia	main	II
Australia	South Far Western Plains	*	177	17.9		810	Australasia	main	III
Australia	South Kennedy	*	446	15.2		2492	Australasia	main	II
Australia	South Western Plains	*	436	26.4		1218	Australasia	main	III
Australia	South Western Slopes	*	477	32.8		977	Australasia	main	II
Australia	South-Eastern	*	631	30.3		1451	Australasia	main	III
Australia	Southern Lofty	*	1013	40.8		1472	Australasia	main	III
Australia	Southern Tablelands	*	573	21.8		2054	Australasia	main	II
Australia	Swan Coastal Plain	*	747	14.3		4470	Australasia	main	IV
Australia	Tanami	*	6	1.5		401	Australasia	main	III
Australia	Victoria Bonaparte	*	138	8.6		1475	Australasia	main	III
Australia	Warrego	*	212	13.4		1366	Australasia	main	II
Australia	Warren	*	482	14.5		2851	Australasia	main	IV
Australia	Western Australia		1186	12.1	91	8588	Australasia	main	IV
Australia	Wide Bay	*	597	21.4		2188	Australasia	main	II
Australia	Yalgoo	*	59	2.8		2026	Australasia	main	IV
Australia	Yorke Peninsula	*	364	29.0		890	Australasia	main	III
Austria		*	257	7.9	17	3007	Europe	main	VI
Albania		*	106	2.7	7	3758	Europe	main	IV
Belarus		*	187		33		Europe	main	VI
Belgium		*	508	26.9	84	1378	Europe	main	VI
Bulgaria		*	593	12.9	85	3997	Europe	main	VI
Croatia		*	300	6.6	100	4275	Europe	main	IV
Czech Republic		*	249	9.4	86	2401	Europe	main	VI
Denmark		*	430	29.1	37	1050	Europe	main	VI
Estonia		*	232	13.9	54	1441	Europe	main	VI
Finland		*	125	9.2	30	1240	Europe	main	VIII
France		*	716	17.5	69	3382	Europe	main	VI
Germany		*	451	14.1	60	2749	Europe	main	VI
Greece		*	136	2.8	50	4652	Europe	main	IV
Hungary		*	141	5.0	28	2678	Europe	main	VI
Italy		*	478	6.9	139	6400	Europe	main	IV
Latvia		*	274	17.7	23	1277	Europe	main	VI
Liechtenstein		*	77	5.2	3	1410	Europe	main	VI
Lithuania		*	259	16.3	23	1334	Europe	main	VI
Luxembourg		*	105	7.4		1323	Europe	main	VI
Macedonia (FYR)		*	17				Europe	main	IV

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
Moldova		*	186		37		Europe	main	VII
Montenegro				0.0	51	3650	Europe	main	VI
Netherlands		*	230	13.4	21	1490	Europe	main	VI
Norway		*	595	32.2	12	1253	Europe	main	VIII
Poland		*	386	14.5	25	2283	Europe	main	VI
Portugal		*	254	9.7	31	2367	Europe	main	IV
Romania		*	108	3.3	10	3123	Europe	main	VI
Russia	Arctic European		5	1.1		444	Europe	main	IX
Russia	Dvina Pechora		56	5.2		1024	Europe	main	VIII
Russia	Karelia Lapland		50	5.1		921	Europe	main	VIII
Russia	Ladoga Ilmen		87	6.6		1229	Europe	main	VIII
Russia	Leningrad	*	172	8.7	33	1812	Europe	main	VIII
Russia	Lipetsk	*	154	11.2	71	1224	Europe	main	VI
Russia	Lower Don		104	6.5		1488	Europe	main	VII
Russia	Mordovia	*	164	13.9	55	1015	Europe	main	VI
Russia	Moskva	*	649	36.7	86	1117	Europe	main	VIII
Russia	Ryazan	*	140	12.2	58	1012	Europe	main	VI
Russia	Tula	*	150	12.9	52	1009	Europe	main	VI
Russia	Tver	*	178	12.4	49	1255	Europe	main	VIII
Russia	Volga Kama		78	5.2		1431	Europe	main	VIII
Russia	Voronezh	*	209	10.7	69	1741	Europe	main	VI
Serbia			147	3.9	9	3662	Europe	main	VI
Slovakia		*	162	4.9	34	3124	Europe	main	VI
Slovenia		*	230	7.6	32	2800	Europe	main	VI
Spain		*	454	8.2	61	5050	Europe	main	IV
Supranational reg.	Bessarabia		96	9.5		917	Europe	main	VI
Supranational reg.	Middle Dnieper		124	7.1		1612	Europe	main	VI
Supranational reg.	Transvolga Area		78	5.6		1308	Europe	main	VII
Supranational reg.	Upper Dnieper		96	6.3		1425	Europe	main	VI
Sweden		*	874	34.8	40	1638	Europe	main	VIII
Switzerland		*	93	3.6	27	2505	Europe	main	VI
Turkey	Turkey (European part)	*	94				Europe	main	IV
Ukraine	Black Sea Area		125	6.9		1689	Europe	main	VII
Ukraine	Crimea		138	6.4		2014	Europe	main	VI
Ukraine	Ukraine	*	626	22.7	13	2130	Europe	main	VI
Ukraine	Upper Dniester		92	8.2		1029	Europe	main	VI
Canada	Alberta	*	360	17.8	57	1657	North-Amer	main	VIII
Canada	British Columbia	*	934	28.2	93	2373	North-Amer	main	VIII
Canada	Labrador	*	130	14.8	0	749	North-Amer	main	VIII
Canada	Manitoba	*	366	20.7	67	1405	North-Amer	main	VIII
Canada	New Brunswick	*	586	31.7	24	1265	North-Amer	main	VI
Canada	Northwest Territories	*	118	9.9	1	1079	North-Amer	main	VIII
Canada	Nova Scotia	*	662	35.0	36	1231	North-Amer	main	VIII
Canada	Nunavut	*	14	2.4	2	560	North-Amer	main	IX
Canada	Ontario	*	1108	33.0	68	2248	North-Amer	main	VIII
Canada	Quèbec	*	862	28.1	53	2202	North-Amer	main	VIII
Canada	Saskatchewan	*	379	22.2	59	1325	North-Amer	main	VIII
Canada	Yukon	*	161	12.7	5	1111	North-Amer	main	VIII
Mexico			519	2.0	77	26071	North-Amer	main	several
Mexico	Aguascalientes	*	108	6.6		1520	North-Amer	main	III
Mexico	Baja California	*	219	9.4		2111	North-Amer	main	III
Mexico	Baja California Sur	*	114	6.3		1700	North-Amer	main	III
Mexico	Campeche	*	117	5.6		1970	North-Amer	main	II
Mexico	Chiapas	*	289	3.7		7573	North-Amer	main	I
Mexico	Chihuahua	*	148	4.2		3356	North-Amer	main	III

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
Mexico	Coahuila	*	180	5.4		3125	North-Amer	main	III
Mexico	Colima	*	85	4.5		1807	North-Amer	main	II
Mexico	Durango	*	125	3.7		3288	North-Amer	main	III
Mexico	Guanajuato	*	92	5.0		1755	North-Amer	main	III
Mexico	Guerrero	*	123	2.6		4648	North-Amer	main	II
Mexico	Hidalgo	*	193	5.6		3239	North-Amer	main	II
Mexico	Jalisco	*	217	4.1		5105	North-Amer	main	II
Mexico	Mexico state	*	236	6.5		3401	North-Amer	main	III
Mexico	Michoacan	*	241	4.9		4672	North-Amer	main	II
Mexico	Morelos	*	213	6.4		3134	North-Amer	main	III
Mexico	Nayarit	*	117	3.3		3428	North-Amer	main	II
Mexico	Nuevo Leon	*	125	4.6		2600	North-Amer	main	III
Mexico	Oaxaca	*	218	2.9		7399	North-Amer	main	II
Mexico	Puebla	*	175	5.2		3200	North-Amer	main	II
Mexico	Queretaro	*	147	4.8		2887	North-Amer	main	III
Mexico	Quintana Roo	*	76	4.8		1501	North-Amer	main	I
Mexico	San Luis Potosi	*	102	3.4		2858	North-Amer	main	II
Mexico	Sinaloa	*	128	4.6		2668	North-Amer	main	II
Mexico	Sonora	*	162	5.0		3079	North-Amer	main	III
Mexico	Tabasco	*	113	4.7		2292	North-Amer	main	II
Mexico	Tamaulipas	*	128	4.3		2824	North-Amer	main	II
Mexico	Tlaxcala	*	104	9.0		1049	North-Amer	main	III
Mexico	Veracruz	*	333	4.6		6869	North-Amer	main	II
Mexico	Yucatan	*	98	6.1		1499	North-Amer	main	II
Mexico	Zacatecas	*	92	3.9		2251	North-Amer	main	III
USA	Alabama	*	1125	26.3	92	3148	North-Amer	main	VI
USA	Alaska	*	288	16.7	24	1432	North-Amer	main	VIII
USA	Arizona	*	644	14.7	82	3749	North-Amer	main	III
USA	Arkansas	*	706	23.9	65	2244	North-Amer	main	VI
USA	California	*	1753	23.7	209	5647	North-Amer	main	IV
USA	Colorado	*	588	17.5	65	2781	North-Amer	main	VII
USA	Connecticut	*	1109	37.3	100	1864	North-Amer	main	VI
USA	Delaware	*	748	30.5	56	1707	North-Amer	main	VI
USA	District of Columbia		520	28.2	13	1322	North-Amer	main	VI
USA	Florida	*	1473	30.0	167	3440	North-Amer	main	V
USA	Georgia	*	945	22.9	79	3181	North-Amer	main	VI
USA	Idaho	*	615	19.7	54	2500	North-Amer	main	VII
USA	Illinois	*	1050	30.8	62	2355	North-Amer	main	VI
USA	Indiana	*	813	27.7	57	2120	North-Amer	main	VI
USA	Iowa	*	624	27.0	55	1691	North-Amer	main	VI
USA	Kansas	*	543	23.2	66	1794	North-Amer	main	VI
USA	Kentucky	*	839	28.1	62	2143	North-Amer	main	VI
USA	Louisiana	*	927	27.4	87	2451	North-Amer	main	VI
USA	Maine	*	889	34.5	52	1686	North-Amer	main	VI
USA	Maryland	*	1176	33.4	66	2343	North-Amer	main	VI
USA	Massachusetts	*	1496	42.6	80	2015	North-Amer	main	VI
USA	Michigan	*	1082	33.8	82	2120	North-Amer	main	VI
USA	Minnesota	*	613	25.2	67	1819	North-Amer	main	VI
USA	Mississippi	*	795	24.0	80	2516	North-Amer	main	VI
USA	Missouri	*	891	29.4	61	2139	North-Amer	main	VI
USA	Montana	*	584	20.5	66	2269	North-Amer	main	VII
USA	Nebraska	*	486	23.8	51	1555	North-Amer	main	VI
USA	Nevada	*	431	12.8	73	2947	North-Amer	main	VII
USA	New Hampshire	*	678	29.5	64	1621	North-Amer	main	VI
USA	New Jersey	*	1174	35.4	73	2145	North-Amer	main	VI

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
USA	New Mexico	*	558	13.7	70	3514	North-Amer	main	III
USA	New York	*	1598	39.8	70	2421	North-Amer	main	VI
USA	North Carolina	*	1106	27.2	89	2963	North-Amer	main	VI
USA	North Dakota	*	340	22.8	36	1152	North-Amer	main	VI
USA	Ohio	*	1137	34.7	64	2135	North-Amer	main	VI
USA	Oklahoma	*	558	18.4	62	2477	North-Amer	main	VI
USA	Oregon	*	1118	25.4	93	3288	North-Amer	main	VI
USA	Pennsylvania	*	1404	37.6	83	2332	North-Amer	main	VI
USA	Rhode Island	*	695	19.5	45	2877	North-Amer	main	VI
USA	South Carolina	*	968	25.6	76	2810	North-Amer	main	VI
USA	South Dakota	*	367	19.3	46	1532	North-Amer	main	VI
USA	Tennessee	*	725	23.1	83	2415	North-Amer	main	VI
USA	Texas	*	1025	17.9	137	4689	North-Amer	main	III
USA	Utah	*	644	17.5	59	3043	North-Amer	main	VII
USA	Vermont	*	780	32.5	62	1619	North-Amer	main	VI
USA	Virginia	*	1065	28.3	87	2704	North-Amer	main	VI
USA	Washington	*	1083	29.2	140	2624	North-Amer	main	VI
USA	Washington DC	*	551	29.4	8	1321	North-Amer	main	VI
USA	West Virginia	*	774	28.5	56	1946	North-Amer	main	VI
USA	Wisconsin	*	857	30.8	56	1926	North-Amer	main	VI
USA	Wyoming	*	418	15.4	43	2297	North-Amer	main	VII
Argentina			553	7.6	53	6716	South-Amer	main	several
Argentina	Buenos Aires	*	413	15.6		2241	South-Amer	main	V
Argentina	Catamarca	*	83	3.9		2065	South-Amer	main	I
Argentina	Chaco	*	60	3.2		1802	South-Amer	main	I
Argentina	Chubut	*	165	10.9		1345	South-Amer	main	VII
Argentina	Ciudad de Buenos Aires	*	101	20.0		403	South-Amer	main	VII
Argentina	Cordoba	*	195	9.2		1929	South-Amer	main	I
Argentina	Corrientes	*	100	3.3		2907	South-Amer	main	I
Argentina	Entre Rios	*	199	8.5		2149	South-Amer	main	I
Argentina	Formosa	*	43	2.6		1599	South-Amer	main	I
Argentina	Jujuy	*	103	3.3		3045	South-Amer	main	I
Argentina	La Pampa	*	177	14.9		1010	South-Amer	main	III
Argentina	La Rioja	*	68	4.5		1450	South-Amer	main	I
Argentina	Mendoza	*	186	9.7		1738	South-Amer	main	III
Argentina	Misiones	*	78	2.4		3166	South-Amer	main	I
Argentina	Neuquen	*	186	9.9		1691	South-Amer	main	VII
Argentina	Rio Negro	*	220	11.6		1677	South-Amer	main	VII
Argentina	Salta	*	134	3.8		3432	South-Amer	main	I
Argentina	San Juan	*	89	6.1		1364	South-Amer	main	III
Argentina	San Luis	*	93	7.8		1097	South-Amer	main	III
Argentina	Santa Cruz	*	129	11.1		1037	South-Amer	main	VII
Argentina	Santa Fe	*	111	5.9		1783	South-Amer	main	I
Argentina	Santiago del Estero	*	68	6.7		953	South-Amer	main	I
Argentina	Tucuman	*	130	4.7		2662	South-Amer	main	I
Belize		*	107	2.6	11	4000	South-Amer	main	I
Bolivia		*	198	1.1	89	17367	South-Amer	main	II
Brazil	Acre	*	75	1.9	4	3928	South-Amer	main	I
Brazil	Alagoas	*	72	5.3	7	1288	South-Amer	main	I
Brazil	Amap	*	56	2.4	3	2302	South-Amer	main	I
Brazil	Amazonas	*	111	1.4	5	7585	South-Amer	main	I
Brazil	Bahia	*	179	2.1	13	8237	South-Amer	main	II
Brazil	Cear	*	108	5.1	9	2025	South-Amer	main	II
Brazil	Distrito Federal	*	130	4.4		2827	South-Amer	main	II
Brazil	Espirito Santo	*	102	2.2	17	4490	South-Amer	main	I

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
Brazil	Goiás	*	127	2.4	7	5115	South-Amer	main	II
Brazil	Maranhao	*	82	3.2	10	2495	South-Amer	main	II
Brazil	Mato Grosso	*	113	2.2	7	4937	South-Amer	main	I
Brazil	Mato Grosso do Sul	*	112	3.6	14	3012	South-Amer	main	II
Brazil	Minas Gerais	*	226	2.1	19	10710	South-Amer	main	II
Brazil	Par	*	111	1.9	6	5839	South-Amer	main	I
Brazil	Paraiba	*	102	6.9	9	1378	South-Amer	main	II
Brazil	Paran	*	238	4.0	26	5685	South-Amer	main	V
Brazil	Pernambuco	*	139	4.9	18	2699	South-Amer	main	II
Brazil	Piaui	*	72	4.6	7	1490	South-Amer	main	II
Brazil	Rio de Janeiro	*	207	2.8	17	7280	South-Amer	main	I
Brazil	Rio Grande do Norte	*	70	8.4	9	760	South-Amer	main	II
Brazil	Rio Grande do Sul	*	229	5.5	18	3916	South-Amer	main	V
Brazil	Rondonia	*	32	1.2	3	2725	South-Amer	main	I
Brazil	Roraima	*	42	1.7		2403	South-Amer	main	I
Brazil	Santa Catarina	*	230	4.9	18	4491	South-Amer	main	V
Brazil	Sao Paulo	*	315	4.1	22	7386	South-Amer	main	V
Brazil	Sergipe	*	46	4.9	6	888	South-Amer	main	I
Brazil	Tocantins	*	35	2.2	2	1566	South-Amer	main	II
Chile			743	12.2	50	5364	South-Amer	main	several
Chile	Aisen	*	54	22.9		182	South-Amer	main	VI
Chile	Antartica Chilena	*	9	10.5		77	South-Amer	main	IX
Chile	Antofagasta	*	74	13.2		486	South-Amer	main	III
Chile	Arauco	*	96	24.1		302	South-Amer	main	IV
Chile	Arica	*	84	34.0		163	South-Amer	main	III
Chile	Bío Bío province	*	139	22.5		479	South-Amer	main	IV
Chile	Bío Bío region		413	20.5		1599	South-Amer	main	IV
Chile	Cachapoal	*	61	28.5		153	South-Amer	main	IV
Chile	Capitan Prat	*	3	7.1		39	South-Amer	main	VI
Chile	Cardenal Caro	*	57	36.3		100	South-Amer	main	IV
Chile	Cauquenes	*	81	35.7		146	South-Amer	main	IV
Chile	Cautin	*	250	36.0		445	South-Amer	main	IV
Chile	Chacabuco	*	23	11.2		182	South-Amer	main	IV
Chile	Chaparal	*	8	8.6		85	South-Amer	main	III
Chile	Chiloe	*	150	42.4		204	South-Amer	main	VI
Chile	Choapa	*	91	24.5		280	South-Amer	main	III
Chile	Coihaique	*	6	3.7		157	South-Amer	main	VI
Chile	Colchagua	*	100	25.7		289	South-Amer	main	IV
Chile	Concepcion	*	229	41.3		326	South-Amer	main	IV
Chile	Copiapo	*	54	21.3		200	South-Amer	main	III
Chile	Coquimbo		257	20.3		1012	South-Amer	main	III
Chile	Cordillera	*	46	11.1		370	South-Amer	main	IV
Chile	Curico	*	156	33.6		308	South-Amer	main	IV
Chile	El Loa	*	45	15.8		240	South-Amer	main	III
Chile	Elqui	*	85	21.1		318	South-Amer	main	III
Chile	General Carrera	*	6	3.6		163	South-Amer	main	VI
Chile	Huasco	*	84	25.2		249	South-Amer	main	III
Chile	Iquique	*	41	63.1		24	South-Amer	main	III
Chile	Libertador General Bernardo O'Higgins		278	33.9		542	South-Amer	main	IV
Chile	Limari	*	111	21.1		414	South-Amer	main	III
Chile	Linares	*	139	33.7		274	South-Amer	main	IV
Chile	Llanquihue	*	93	26.1		263	South-Amer	main	VI
Chile	Los Andes	*	83	25.7		240	South-Amer	main	IV
Chile	Magallanes	*	104	29.4		250	South-Amer	main	VIII

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Chile	Maipo	*	24	19.5		99	South-Amer	main	IV
Chile	Malleco	*	198	26.7		543	South-Amer	main	IV
Chile	Maule		327	23.1		1089	South-Amer	main	IV
Chile	Melipilla	*	4	4.7		82	South-Amer	main	IV
Chile	Nuble	*	204	29.3		492	South-Amer	main	IV
Chile	Osorno	*	128	30.5		292	South-Amer	main	VI
Chile	Palena	*	4	2.7		145	South-Amer	main	VI
Chile	Parinacota	*	9	3.4		258	South-Amer	main	III
Chile	Petorca	*	78	40.2		116	South-Amer	main	IV
Chile	Quillota	*	166	39.5		254	South-Amer	main	IV
Chile	San Antonio	*	129	60.8		83	South-Amer	main	IV
Chile	San Felipe de Aconcagua	*	73	38.6		116	South-Amer	main	IV
Chile	Santiago	*	290	42.3		396	South-Amer	main	IV
Chile	Santiago Metropolitan		379	24.6		1160	South-Amer	main	IV
Chile	Talagante	*	9	22.5		31	South-Amer	main	IV
Chile	Talca	*	151	29.5		361	South-Amer	main	IV
Chile	Tocopilla	*	11	21.6		40	South-Amer	main	III
Chile	Ultima Esperanza	*	88	19.1		373	South-Amer	main	VIII
Chile	Valdivia	*	216	36.2		380	South-Amer	main	VI
Chile	Valparaiso province	*	239	48.5		254	South-Amer	main	IV
Chile	Valparaiso region		369	25.8		1063	South-Amer	main	IV
Colombia		*	296	0.6	72	51220	South-Amer	main	I
Costa Rica		*	280	2.3	47	12119	South-Amer	main	I
Ecuador		*	595	3.0	12	19362	South-Amer	main	I
El Salvador					4	2911	South-Amer	main	I
French Guiana		*	162	2.7	5	5750	South-Amer	main	I
Guatemala					10	7754	South-Amer	main	I
Guyana		*	113	1.7	52	6409	South-Amer	main	I
Honduras					10	6166	South-Amer	main	I
Mexico	Distrito Federal	*	190	9.9		1722	South-Amer	main	III
Nicaragua		*	671	10.4	7	5796	South-Amer	main	I
Panama		*	263	2.8	8	9147	South-Amer	main	I
Paraguay			173	3.0	20	5521	South-Amer	main	II
Peru		*	360	2.0	29	17900	South-Amer	main	I
Suriname		*	116	2.3	28	5018	South-Amer	main	I
Uruguay		*	378	14.4	65	2253	South-Amer	main	V
Venezuela		*	101	0.6	36	15820	South-Amer	main	I
Cape Verde		*	740	49.4	5	757	Africa	isl	II
Cape Verde	Boavista		91	49.2		94	Africa	isl	II
Cape Verde	Branco		19	32.2		40	Africa	isl	II
Cape Verde	Brava		148	61.7		92	Africa	isl	II
Cape Verde	Fogo		223	61.8		138	Africa	isl	II
Cape Verde	Maio		115	57.8		84	Africa	isl	II
Cape Verde	Raso		19	28.4		48	Africa	isl	II
Cape Verde	Sal		54	42.9		72	Africa	isl	II
Cape Verde	Santa Luzia		28	37.3		47	Africa	isl	II
Cape Verde	Santiago		294	65.9		152	Africa	isl	II
Cape Verde	Santo Antao		294	62.6		176	Africa	isl	II
Cape Verde	Sao Nicolau		170	56.5		131	Africa	isl	II
Cape Verde	Sao Vicente		149	54.0		127	Africa	isl	II
Comoros		*	100		65		Africa	isl	I
France	La Reunion		628	40.7	71	915	Africa	isl	II
Great Britain	Ascension Island	*	157	86.3	1	25	Africa	isl	II
Great Britain	Diego Garcia	*	130	78.3		36	Africa	isl	I
Great Britain	St Helena	*	252	80.8	8	60	Africa	isl	II

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Guinea Bissau	Bijagos		15				Africa	isl	I
Madagascar		*	517	4.1	101	12000	Africa	isl	II
Mauritius		*	731	45.2	61	887	Africa	isl	II
Mauritius	Rodrigues		305	66.4	11	154	Africa	isl	II
Portugal	Azores	*	760	41.2	16	1086	Africa	isl	VI
Portugal	Desertas	*	13	6.7		182	Africa	isl	V
Portugal	Madeira	*	789	54.8	13	650	Africa	isl	V
Portugal	Porto Santo	*	92	21.8		330	Africa	isl	V
Portugal	Salvage Islands	*	15	15.6		81	Africa	isl	V
Sao Tome and Principe		*	314	28.1	1	803	Africa	isl	I
Sao Tome and Principe	Principe		19	6.0		300	Africa	isl	I
Sao Tome and Principe	Sao Tome		30	4.1		700	Africa	isl	I
Seychelles			165	42.6	21	222	Africa	isl	II
Seychelles	African Banks	*	2	13.3		13	Africa	isl	I
Seychelles	Aldabra	*	53	19.9	1	214	Africa	isl	I
Seychelles	Alphonse	*	27	40.3		40	Africa	isl	I
Seychelles	Aride	*	40	41.7		56	Africa	isl	I
Seychelles	Assumption	*	35	23.3		115	Africa	isl	I
Seychelles	Astove	*	32	22.5		110	Africa	isl	I
Seychelles	Bird	*	88	57.9		64	Africa	isl	I
Seychelles	Booby Island	*	1	10.0		9	Africa	isl	I
Seychelles	Cocos	*	2	22.2		7	Africa	isl	I
Seychelles	Coetivy	*	54	50.5		53	Africa	isl	I
Seychelles	Conception	*	37	39.8		56	Africa	isl	I
Seychelles	Cosmoledo	*	26	19.5		107	Africa	isl	I
Seychelles	Cousin	*	79	53.0		70	Africa	isl	I
Seychelles	Cousine	*	3	17.6		14	Africa	isl	I
Seychelles	Curieuse	*	124	50.2		123	Africa	isl	I
Seychelles	Darros	*	52	49.5		53	Africa	isl	I
Seychelles	Denis	*	114	60.6		74	Africa	isl	I
Seychelles	Desnoefs	*	15	51.7		14	Africa	isl	I
Seychelles	Desroches	*	26	38.8		41	Africa	isl	I
Seychelles	Farquhar	*	39	47.6		43	Africa	isl	I
Seychelles	Felicite	*	81	39.9		122	Africa	isl	I
Seychelles	Fregate	*	100	48.1		108	Africa	isl	I
Seychelles	Grande Soeur	*	63	50.8		61	Africa	isl	I
Seychelles	Ile Anonyme	*	34	54.8		28	Africa	isl	I
Seychelles	Ile au Cerf	*	27	50.9		26	Africa	isl	I
Seychelles	Ile aux Vaches Marines	*	2	11.8		15	Africa	isl	I
Seychelles	Ile Longue	*	21	32.3		44	Africa	isl	I
Seychelles	Ile St Anne	*	67	59.8		45	Africa	isl	I
Seychelles	La Digue	*	77	52.7		69	Africa	isl	I
Seychelles	Mahe	*	287	46.1		336	Africa	isl	I
Seychelles	Marianne	*	77	51.3		73	Africa	isl	I
Seychelles	Marie-Louise	*	29	50.9		28	Africa	isl	I
Seychelles	North Island	*	125	56.1		98	Africa	isl	I
Seychelles	Petit Soeur	*	2	11.8		15	Africa	isl	I
Seychelles	Platte	*	20	39.2		31	Africa	isl	I
Seychelles	Poivre	*	39	52.0		36	Africa	isl	I
Seychelles	Praslin	*	104	35.7		187	Africa	isl	I
Seychelles	Providence	*	7	33.3		14	Africa	isl	I
Seychelles	Recifs	*	2	16.7		10	Africa	isl	I
Seychelles	Remire	*	25	41.7		35	Africa	isl	I

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Seychelles	Silhouette	*	131	32.8		269	Africa	isl	I
Seychelles	St Francois	*	4	22.2		14	Africa	isl	I
Seychelles	St Joseph	*	16	34.0		31	Africa	isl	I
Seychelles	St Pierre	*	10	33.3		20	Africa	isl	I
Seychelles	Therese	*	84	47.2		94	Africa	isl	I
South Africa	Dassen		15	48.4		16	Africa	isl	IV
South Africa	Jutten		12	63.2		7	Africa	isl	IV
South Africa	Meeu		8	29.6		19	Africa	isl	IV
South Africa	Robben		38	27.3		101	Africa	isl	IV
South Africa	Schappen		5	29.4		12	Africa	isl	IV
Spain	Canary Islands	*	548	29.7	14	1300	Africa	isl	II
Australia	Macquarie Island	*	3	6.4	1	44	Antarctica	isl	IX
France	Amsterdam Island		17	48.6		18	Antarctica	isl	VI
France	Crozet Islands	*	59	74.7	7	20	Antarctica	isl	VI
France	Kerguelen Islands	*	67	69.1	7	30	Antarctica	isl	IX
Great Britain	Falkland Islands		83	33.7	4	163	Antarctica	isl	VIII
Great Britain	Gough Island	*	12	17.6		56	Antarctica	isl	VI
Great Britain	Heard Island	*	1	8.3	0	11	Antarctica	isl	IX
Great Britain	Inaccessible Island	*	19	26.8		52	Antarctica	isl	II
Great Britain	Nightingale	*	5	14.3		30	Antarctica	isl	II
Great Britain	South Georgia Island	*	31	54.4	1	26	Antarctica	isl	IX
Great Britain	Tristan da Cunha	*	82	56.9		62	Antarctica	isl	II
South Africa	Marion Island	*	12	34.3		23	Antarctica	isl	VI
South Africa	Prince Edward Island	*	3	12.5	0	21	Antarctica	isl	VI
Cyprus		*	143	7.6	16	1738	Asia-temp	isl	IV
China	Hainan	*	244	7.4	66	3046	Asia-temp	isl	V
Iran	Hormuz and Qeshm		49	17.6		230	Asia-temp	isl	III
Japan		*	1311	22.6	163	4490	Asia-temp	isl	V
Russia	Antsiferova, Kuril Islands	*	1	5.6		17	Asia-temp	isl	VIII
Russia	Anuchina, Kuril Islands	*	16	16.7		80	Asia-temp	isl	VIII
Russia	Demina, Kuril Islands	*	2	4.9		39	Asia-temp	isl	VIII
Russia	Ekarma, Kuril Islands	*	2	4.2		46	Asia-temp	isl	VIII
Russia	Iturup, Kuril Islands	*	19	3.4		535	Asia-temp	isl	VIII
Russia	Ketoi, Kuril Islands	*	1	0.5		219	Asia-temp	isl	VIII
Russia	Kharimkotan, Kuril Islands	*	2	1.1		177	Asia-temp	isl	VIII
Russia	Kunashir, Kuril Islands	*	24	3.7		619	Asia-temp	isl	VIII
Russia	Makanrushi, Kuril Islands	*	2	1.9		106	Asia-temp	isl	VIII
Russia	Matua, Kuril Islands	*	3	2.2		131	Asia-temp	isl	VIII
Russia	Novaya Zemlya		2	1.2		171	Asia-temp	isl	IX
Russia	Paramushir, Kuril Islands	*	3	0.9		334	Asia-temp	isl	VIII
Russia	Polonskogo, Kuril Islands	*	10	7.9		117	Asia-temp	isl	VIII
Russia	Sakhalin		92	10.4		795	Asia-temp	isl	VIII
Russia	Shikotan, Kuril Islands	*	19	3.7		499	Asia-temp	isl	VIII
Russia	Shimushir, Kuril Islands	*	8	3.2		240	Asia-temp	isl	VIII
Russia	Shumushu, Kuril Islands	*	2	0.8		261	Asia-temp	isl	VIII
Russia	Storozhevoy, Kuril Islands	*	3	21.4		11	Asia-temp	isl	VIII
Russia	Tanfilyeva, Kuril Islands	*	20	11.9		148	Asia-temp	isl	VIII
Russia	Urup, Kuril Islands	*	1	0.3		304	Asia-temp	isl	VIII
Russia	Ushishir, Kuril Islands	*	1	1.0		103	Asia-temp	isl	VIII
Russia	Yuri, Kuril Islands	*	16	8.8		165	Asia-temp	isl	VIII
Russia	Zeleny, Kuril Islands	*	22	12.4		156	Asia-temp	isl	VIII
Taiwan		*	607	13.5	54	3875	Asia-temp	isl	V
Australia	Cocos (Keeling) Main Atoll	*	56	46.3	6	65	Asia-trop	isl	I
Australia	Cocos (Keeling) North Keeling Island	*	6	15.4		33	Asia-trop	isl	I

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Australia	Christmas Island	*	176	45.7	28	209	Asia-trop	isl	I
Brunei					7	6000	Asia-trop	isl	I
India	Andaman and Nicobar	*	33	1.4	5	2270	Asia-trop	isl	I
India	Lakshadweep	*	28	7.4	1	348	Asia-trop	isl	I
Indonesia		*	503	1.7	50	29375	Asia-trop	isl	I
Indonesia	Kalimantan				7	900	Asia-trop	isl	I
Indonesia	Maluku				5	380	Asia-trop	isl	I
Indonesia	Sulawesi				6	520	Asia-trop	isl	I
Indonesia	Sumatra				10	820	Asia-trop	isl	I
Maldives					4	277	Asia-trop	isl	I
Papua New Guinea					50	11544	Asia-trop	isl	I
Philippines		*	628	6.4	49	9200	Asia-trop	isl	I
Singapore		*	221	9.3	68	2156	Asia-trop	isl	I
Solomon Islands			200	5.9	27	3200	Asia-trop	isl	I
Sri Lanka		*	365	9.8	30	3368	Asia-trop	isl	I
Australia	Alexander Island	*	15	44.1		19	Australasia	isl	IV
Australia	Ashmore Reef	*	6	20.7		23	Australasia	isl	I
Australia	Beacon Island	*	14	48.3		15	Australasia	isl	IV
Australia	Carnac Island		34	43.0		45	Australasia	isl	VI
Australia	Coral Sea Islands Territory	*	5	19.2		21	Australasia	isl	I
Australia	East Wallabi Island	*	27	21.6		98	Australasia	isl	IV
Australia	Gilbert Island	*	5	31.3		11	Australasia	isl	IV
Australia	Gun Island	*	11	47.8		12	Australasia	isl	IV
Australia	Helms Island	*	51	47.2		57	Australasia	isl	IV
Australia	Heron Island		25	48.1		27	Australasia	isl	V
Australia	Hummock Island	*	1	14.3		6	Australasia	isl	IV
Australia	Christmas Island (near King Island)		151	42.9		201	Australasia	isl	II
Australia	Kangaroo Island	*	300	25.8		865	Australasia	isl	II
Australia	Leo Island	*	10	34.5		19	Australasia	isl	IV
Australia	Little Rat Island	*	22	51.2		21	Australasia	isl	IV
Australia	Long Island, Houtman Abrolhos	*	10	30.3		23	Australasia	isl	IV
Australia	Lord Howe Island	*	229	48.6	10	242	Australasia	isl	V
Australia	Middle Island	*	7	19.4		29	Australasia	isl	IV
Australia	Morley Island	*	10	37.0		17	Australasia	isl	IV
Australia	Murray Island	*	2	20.0		8	Australasia	isl	IV
Australia	Newman Island	*	6	30.0		14	Australasia	isl	IV
Australia	North Island, Houtman Abrolhos	*	24	31.2		53	Australasia	isl	IV
Australia	Pelsaert Island	*	19	38.8		30	Australasia	isl	IV
Australia	Pigeon Island	*	26	36.6		45	Australasia	isl	IV
Australia	Rat Island	*	30	44.8		37	Australasia	isl	IV
Australia	Seagull Island	*	8	18.6		35	Australasia	isl	IV
Australia	Serventy Island	*	13	43.3		17	Australasia	isl	IV
Australia	Suomi Island	*	5	27.8		13	Australasia	isl	IV
Australia	Tasmania	*	860	27.8	50	2230	Australasia	isl	VI
Australia	Uncle Margie Island	*	10	52.6		9	Australasia	isl	IV
Australia	West Wallabi Island	*	24	25.0		72	Australasia	isl	IV
Australia	White Island	*	8	28.6		20	Australasia	isl	IV
Australia	Wooded Island	*	11	44.0		14	Australasia	isl	IV
New Zealand		*	1726	44.5	140	2151	Australasia	isl	V
New Zealand	Auckland Islands	*	36	14.9		205	Australasia	isl	VI
New Zealand	Chatham Islands	*	425	50.3		420	Australasia	isl	V
New Zealand	Kermadec Island		88	43.1	7	116	Australasia	isl	V

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New Zealand	Norfolk Island	*	271	61.3	44	171	Australasia	isl	II
Faroe Islands		*	28	8.3	3	310	Europe	isl	VIII
France	Corsica	*	397	15.5	7	2160	Europe	isl	IV
Great Britain	England	*	1379	47.0	30	1552	Europe	isl	VI
Great Britain	Isle of Man	*	798	56.0		627	Europe	isl	VI
Great Britain	Jersey and Guernsey	*	834	52.2		765	Europe	isl	VI
Great Britain	Northern Ireland	*	389	27.6	2	1022	Europe	isl	VI
Great Britain	Scotland	*	861	41.8	1	1200	Europe	isl	VI
Great Britain	Wales	*	835	43.6	30	1078	Europe	isl	VI
Iceland			59	11.8	3	442	Europe	isl	IX
Iceland	Central Highlands	*	6	2.3	2	256	Europe	isl	IX
Iceland	East province	*	42	10.0	2	378	Europe	isl	IX
Iceland	North province	*	48	11.3	2	377	Europe	isl	IX
Iceland	North-west province	*	32	8.4	2	347	Europe	isl	IX
Iceland	South province	*	49	12.2	2	353	Europe	isl	IX
Iceland	Surtsey		8	29.6		19	Europe	isl	IX
Iceland	West province	*	51	12.1	2	370	Europe	isl	IX
Ireland		*	363	28.3	77	921	Europe	isl	VI
Italy	Sardinia	*	255	10.8	56	2110	Europe	isl	IV
Italy	Sicily	*	146	5.5	14	2489	Europe	isl	IV
Italy	Tuscany Islands		93	6.7	31	1300	Europe	isl	IV
Malta		*	118		25		Europe	isl	IV
Norway	Jan Mayen	*	6	8.2		67	Europe	isl	IX
Norway	Svalbard	*	6	3.2		180	Europe	isl	IX
Spain	Balearic Islands	*	183	11.9	48	1359	Europe	isl	IV
Canada	Newfoundland	*	415	29.9	15	971	North-Amer	isl	VIII
Canada	Prince Edward Island	*	407	33.4	18	813	North-Amer	isl	VIII
Canada	Sable Island	*	79	35.9		141	North-Amer	isl	VI
France	Saint Pierre and Miquelon	*	198	27.6	26	520	North-Amer	isl	II
Greenland		*	145	23.2	18	479	North-Amer	isl	IX
Mexico	Socorro	*	47	28.8		116	North-Amer	isl	III
Chile	Rapa Nui		68	61.3	16	43	Pacific	isl	II
Cook Islands			401	58.5	58	284	Pacific	isl	I
Cook Islands	Aitutaki	*	184	75.1		61	Pacific	isl	I
Cook Islands	Atiu	*	357	74.1		125	Pacific	isl	I
Cook Islands	Mangaia	*	401	72.9		149	Pacific	isl	I
Cook Islands	Manihiki	*	88	73.3		32	Pacific	isl	I
Cook Islands	Manuae	*	24	41.4		34	Pacific	isl	I
Cook Islands	Mauke	*	339	76.4		105	Pacific	isl	I
Cook Islands	Mitiaro	*	234	68.2		109	Pacific	isl	I
Cook Islands	Nassau	*	46	63.0		27	Pacific	isl	I
Cook Islands	Palmerston	*	73	67.6		35	Pacific	isl	I
Cook Islands	Penrhyn	*	107	76.4		33	Pacific	isl	I
Cook Islands	Pukapuka	*	81	69.8		35	Pacific	isl	I
Cook Islands	Rakahanga	*	71	68.9		32	Pacific	isl	I
Cook Islands	Rarotonga	*	609	70.0		261	Pacific	isl	I
Cook Islands	Suwarrow	*	18	39.1		28	Pacific	isl	I
Cook Islands	Takutea	*	5	13.9		31	Pacific	isl	I
Federated States of Micronesia			383	24.3	79	1194	Pacific	isl	I
Fiji			521	22.8	109	1769	Pacific	isl	I
Fiji	Aiwa, Lau Islands	*	4	5.3		72	Pacific	isl	I
Fiji	Lakeba, Lau Islands	*	109	37.3		183	Pacific	isl	I
Fiji	Nasoata, Fiji Islands	*	18	17.0		88	Pacific	isl	I
Fiji	Nayau, Lau Islands	*	96	35.2		177	Pacific	isl	I
Fiji	Rotuma	*	236	46.0		277	Pacific	isl	I

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
France	Agakauitai, French Polynesia (Gambier Islands)	*	34	64.2		19	Pacific	isl	I
France	Ahunui, French Polynesia (Tuamotu Archipelago)	*	1	9.1		10	Pacific	isl	I
France	Akamaru, French Polynesia (Gambier Islands)	*	77	79.4		20	Pacific	isl	I
France	Anaa, French Polynesia (Tuamotu Archipelago)	*	7	22.6		24	Pacific	isl	I
France	Apataki, French Polynesia (Tuamotu Archipelago)	*	1	12.5		7	Pacific	isl	I
France	Aukena, French Polynesia (Gambier Islands)	*	56	67.5		27	Pacific	isl	I
France	Bellingshausen, French Polynesia	*	2	12.5		14	Pacific	isl	I
France	Bora Bora, French Polynesia (Society Islands)	*	88	38.6		140	Pacific	isl	I
France	Clipperton Island	*	8	36.4		14	Pacific	isl	I
France	Eiao, French Polynesia (Marquesas Islands)	*	62	57.4		46	Pacific	isl	I
France	Fakahina, French Polynesia (Tuamotu Archipelago)	*	1	11.1		8	Pacific	isl	I
France	Fangataufa, French Polynesia (Tuamotu Archipelago)	*	3	18.8		13	Pacific	isl	I
France	Fatu Hiva, French Polynesia (Marquesas Islands)	*	303	63.4		175	Pacific	isl	I
France	Fatu Huku, French Polynesia (Marquesas Islands)	*	9	56.3		7	Pacific	isl	I
France	French Polynesia				123	959	Pacific	isl	I
France	Hao, French Polynesia (Tuamotu Archipelago)	*	35	54.7		29	Pacific	isl	I
France	Hatutaa, French Polynesia (Marquesas Islands)	*	29	50.9		28	Pacific	isl	I
France	Henderson, French Polynesia	*	7	10.0		63	Pacific	isl	II
France	Hiti, French Polynesia (Tuamotu Archipelago)	*	1	11.1		8	Pacific	isl	I
France	Hiva Oa, French Polynesia (Marquesas Islands)	*	430	67.7		205	Pacific	isl	I
France	Huahine, French Polynesia (Society Islands)	*	72	30.5		164	Pacific	isl	I
France	Kamaka, French Polynesia (Gambier Islands)	*	2	25.0		6	Pacific	isl	I
France	Kaukura, French Polynesia (Tuamotu Archipelago)	*	1	10.0		9	Pacific	isl	I
France	Maiao, French Polynesia (Society Islands)	*	17	40.5		25	Pacific	isl	I
France	Makaroa, French Polynesia (Gambier Islands)	*	7	46.7		8	Pacific	isl	I
France	Makatea, French Polynesia (Tuamotu Archipelago)	*	233	76.1		73	Pacific	isl	I
France	Mangareva, French Polynesia (Gambier Islands)	*	335	80.7		80	Pacific	isl	II
France	Manihi, French Polynesia (Tuamotu Archipelago)	*	16	39.0		25	Pacific	isl	I
France	Maria, French Polynesia (Austral Islands)	*	4	14.8		23	Pacific	isl	I

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
France	Marotiri, French Polynesia (Austral Islands)	*	4	36.4		7	Pacific	isl	I
France	Marutea Sud, French Polynesia (Tuamotu Archipelago)	*	1	12.5		7	Pacific	isl	I
France	Mataiva, French Polynesia (Tuamotu Archipelago)	*	1	16.7		5	Pacific	isl	I
France	Matureivavao, French Polynesia (Tuamotu Archipelago)	*	2	10.0		18	Pacific	isl	I
France	Maupiti, French Polynesia (Society Islands)	*	87	34.8		163	Pacific	isl	I
France	Mehetia, French Polynesia (Society Islands)	*	27	38.6		43	Pacific	isl	I
France	Mohotani, French Polynesia (Marquesas Islands)	*	49	58.3		35	Pacific	isl	I
France	Moorea, French Polynesia (Society Islands)	*	317	54.7		262	Pacific	isl	I
France	Mopelia, French Polynesia (Society Islands)	*	12	34.3		23	Pacific	isl	I
France	Moruroa, French Polynesia (Tuamotu Archipelago)	*	25	69.4		11	Pacific	isl	I
France	Nengonengo, French Polynesia (Tuamotu Archipelago)	*	1	12.5		7	Pacific	isl	I
France	New Caledonia	*	600	15.4	98	3298	Pacific	isl	I
France	Niau, French Polynesia (Tuamotu Archipelago)	*	85	59.9		57	Pacific	isl	I
France	Nuku Hiva, French Polynesia (Marquesas Islands)	*	569	69.1		254	Pacific	isl	I
France	Oeno, French Polynesia	*	3	15.8		16	Pacific	isl	I
France	Raiatea, French Polynesia (Society Islands)	*	270	48.7		284	Pacific	isl	I
France	Raivavae, French Polynesia (Austral Islands)	*	267	61.7		166	Pacific	isl	I
France	Rangiroa, French Polynesia (Tuamotu Archipelago)	*	43	51.2		41	Pacific	isl	I
France	Rapa, French Polynesia (Bass Islands)	*	161	43.8		207	Pacific	isl	I
France	Raroia, French Polynesia (Tuamotu Archipelago)	*	10	43.5		13	Pacific	isl	II
France	Rimatara, French Polynesia (Austral Islands)	*	192	70.6		80	Pacific	isl	I
France	Rurutu, French Polynesia (Austral Islands)	*	421	73.7		150	Pacific	isl	I
France	Tahaa, French Polynesia (Society Islands)	*	109	41.0		157	Pacific	isl	I
France	Tahiti, French Polynesia (Society Islands)	*	1346	73.8		477	Pacific	isl	I
France	Tahuata, French Polynesia (Marquesas Islands)	*	148	63.5		85	Pacific	isl	I
France	Taiaro, French Polynesia (Tuamotu Archipelago)	*	1	9.1		10	Pacific	isl	I
France	Takapoto, French Polynesia (Tuamotu Archipelago)	*	26	45.6		31	Pacific	isl	I
France	Takaroa, French Polynesia (Tuamotu Archipelago)	*	1	6.7		14	Pacific	isl	I
France	Takume, French Polynesia (Tuamotu Archipelago)	*	2	12.5		14	Pacific	isl	I

Country	Subregion	NO	Naturalized no.	Naturalized %	Invasive no.	Native no.	TDWG continent	Main /Isl	Zonobiome
France	Tarauru Roa, French Polynesia (Gambier Islands)	*	1	11.1		8	Pacific	isl	I
France	Taravai, French Polynesia (Gambier Islands)	*	95	82.6		20	Pacific	isl	I
France	Tauna, French Polynesia (Gambier Islands)	*	2	22.2		7	Pacific	isl	I
France	Tekava, French Polynesia (Gambier Islands)	*	1	14.3		6	Pacific	isl	I
France	Temoe, French Polynesia (Gambier Islands)	*	4	30.8		9	Pacific	isl	I
France	Tenararo, French Polynesia (Tuamotu Archipelago)	*	2	9.5		19	Pacific	isl	I
France	Tenarunga, French Polynesia (Tuamotu Archipelago)	*	20	51.3		19	Pacific	isl	I
France	Tepoto North, French Polynesia (Tuamotu Archipelago)	*	3	18.8		13	Pacific	isl	I
France	Tetiaroa, French Polynesia (Society Islands)	*	18	29.0		44	Pacific	isl	I
France	Tikehau, French Polynesia (Tuamotu Archipelago)	*	55	56.1		43	Pacific	isl	I
France	Toau, French Polynesia (Tuamotu Archipelago)	*	15	36.6		26	Pacific	isl	I
France	Tubuai, French Polynesia (Austral Islands)	*	304	64.8		165	Pacific	isl	I
France	Tupai, French Polynesia (Society Islands)	*	13	26.5		36	Pacific	isl	I
France	Ua Huka, French Polynesia (Marquesas Islands)	*	314	76.4		97	Pacific	isl	I
France	Ua Pou, French Polynesia (Marquesas Islands)	*	270	75.0		90	Pacific	isl	I
France	Vahanga, French Polynesia (Tuamotu Archipelago)	*	13	41.9		18	Pacific	isl	I
Great Britain	Pitcairn, French Polynesia	*	90	52.6	16	81	Pacific	isl	II
Kiribati			174	72.5	24	66	Pacific	isl	I
Kiribati	Canton, Phoenix Islands	*	47	66.2		24	Pacific	isl	I
Kiribati	Enderbury, Phoenix Islands	*	6	24.0		19	Pacific	isl	I
Kiribati	Gardner, Phoenix Islands	*	11	36.7		19	Pacific	isl	I
Kiribati	Hull, Phoenix Islands	*	21	47.7		23	Pacific	isl	I
Kiribati	Kiritimati, Northern Line Islands	*	49	54.4		41	Pacific	isl	I
Kiribati	McKean, Phoenix Islands	*	1	12.5		7	Pacific	isl	I
Kiribati	Northern Line Islands		41	53.9		35	Pacific	isl	I
Kiribati	Palmyra, Norther Line Islands	*	38	64.4		21	Pacific	isl	I
Kiribati	Sydney, Phoenix Islands	*	11	37.9		18	Pacific	isl	I
Kiribati	Tabueran	*	94	78.3		26	Pacific	isl	I
Kiribati	Teraina, Norther Line Islands	*	63	70.8		26	Pacific	isl	I
Marshall Islands			285	76.8	36	86	Pacific	isl	I
Marshall Islands	Ailinginae Atoll	*	8	27.6		21	Pacific	isl	I
Marshall Islands	Eniwetok	*	50	54.9		41	Pacific	isl	I
Marshall Islands	Majuro Atoll	*	17	23.3		56	Pacific	isl	I
Marshall Islands	Rongelap Atoll	*	35	56.5		27	Pacific	isl	I
Nauru		*	368	86.0	25	60	Pacific	isl	I
New Zealand	Niue		307	63.7	62	175	Pacific	isl	I
Palau			344		58		Pacific	isl	I
Samoa			321	36.9	63	550	Pacific	isl	I
Samoa	Fanuatapu	*	18	24.3		56	Pacific	isl	I
Samoa	Namua	*	59	31.4		129	Pacific	isl	I

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Samoa	Nuulua	*	16	16.8		79	Pacific	isl	I
Samoa	Nuutela	*	46	23.1		153	Pacific	isl	I
Tonga		*	301	40.0	63	451	Pacific	isl	I
Tuvalu					5	50	Pacific	isl	I
USA	Agrihan, Marianas	*	69	37.9		113	Pacific	isl	I
USA	Aguijan, Marianas	*	33	37.5		55	Pacific	isl	I
USA	Alamagan, Marianas	*	71	36.6		123	Pacific	isl	I
USA	American Samoa		236	33.4	50	471	Pacific	isl	I
USA	Anatahan, Marianas	*	54	35.1		100	Pacific	isl	I
USA	Asuncion Island, Marianas	*	16	20.5		62	Pacific	isl	I
USA	Aunuu	*	80	45.2		97	Pacific	isl	I
USA	Farallon de Pajaros, Marianas	*	1	5.9		16	Pacific	isl	I
USA	French Frigate Shoals, Hawai'i Archipelago	*	24	66.7		12	Pacific	isl	I
USA	Guam	*	833	66.5	56	420	Pacific	isl	I
USA	Guguan, Marianas	*	11	17.2		53	Pacific	isl	I
USA	Hawai'i, Hawai'i Archipelago	*	906	62.1		553	Pacific	isl	I
USA	Hawaii Archipelago		1488	48.4	53	1586	Pacific	isl	I
USA	Johnston Island	*	24	88.9	5	3	Pacific	isl	I
USA	Kaho'olawe, Hawai'i Archipelago	*	136	68.3		63	Pacific	isl	I
USA	Kaua'i, Hawai'i Archipelago	*	686	52.4		622	Pacific	isl	I
USA	Ka'ula Rock, Hawai'i Archipelago	*	12	92.3		1	Pacific	isl	II
USA	Kure, Hawai'i Archipelago	*	39	66.1		20	Pacific	isl	I
USA	Lana'i, Hawai'i Archipelago	*	386	51.7		360	Pacific	isl	I
USA	Laysan, Hawai'i Archipelago	*	11	26.8		30	Pacific	isl	I
USA	Lehua, Hawai'i Archipelago	*	37	100.0		0	Pacific	isl	II
USA	Lisianski island, Hawai'i Archipelago	*	3	16.7		15	Pacific	isl	I
USA	Maug Islands, Marianas	*	16	22.5		55	Pacific	isl	I
USA	Maui, Hawai'i Archipelago	*	875	58.4		624	Pacific	isl	I
USA	Midway, Hawai'i Archipelago	*	120	80.5	5	29	Pacific	isl	II
USA	Moloka'i, Hawai'i Archipelago	*	493	50.3		487	Pacific	isl	II
USA	Nihoa, Hawai'i Archipelago	*	6	23.1		20	Pacific	isl	II
USA	Ni'ihau, Hawai'i Archipelago	*	91	48.7		96	Pacific	isl	II
USA	Northern Mariana Islands		298	41.5	35	420	Pacific	isl	I
USA	O'ahu, Hawai'i Archipelago	*	913	61.2		578	Pacific	isl	II
USA	Ofu	*	86	28.3		218	Pacific	isl	I
USA	Olosega	*	33	12.9		223	Pacific	isl	I
USA	Pagan, Mariana Islands	*	101	42.6		136	Pacific	isl	I
USA	Pearl & Hermes, Hawai'i Archipelago	*	10	40.0		15	Pacific	isl	II
USA	Rota, Marianas	*	239	45.7		284	Pacific	isl	I
USA	Saipan, Marianas	*	231	47.9		251	Pacific	isl	I
USA	Sarigan, Marianas	*	40	29.9		94	Pacific	isl	I
USA	Swains	*	32	54.2		27	Pacific	isl	I
USA	Tau	*	131	27.9		338	Pacific	isl	I
USA	Tinian, Marianas	*	214	54.0		182	Pacific	isl	I
USA	Tutuila	*	177	30.7		399	Pacific	isl	I
Vanuatu					26	870	Pacific	isl	I
Argentina	Tierra del Fuego	*	136	24.6		417	South-Amer	isl	IX
Bahamas		*	356	24.3	56	1111	South-Amer	isl	II
Barbados		*	91	13.7	16	572	South-Amer	isl	II
Bonaire		*	38		10		South-Amer	isl	I
Brazil	Trindade and Martin Vaz	*	65	56.0		51	South-Amer	isl	I

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Chile	Alejandro Selkirk Island, Juan Fernadez Islands	*	118	50.6		115	South-Amer	isl	V
Chile	Juan Fernandez Islands		232	52.6		209	South-Amer	isl	V
Chile	Robinso Crusoe Island, Juan Fernandez Islands	*	190	56.9		144	South-Amer	isl	V
Chile	Santa Clara Island, Juan Fernadez Islands	*	25	71.4		10	South-Amer	isl	V
Chile	Tierra del Fuego	*	54	18.1		245	South-Amer	isl	IX
Cuba		*	542	7.7	181	6498	South-Amer	isl	II
Dominica		*	81	6.2	16	1226	South-Amer	isl	II
Dominican Republic		*	227	3.9	45	5600	South-Amer	isl	II
Ecuador	Galapagos	*	263	32.3	48	552	South-Amer	isl	II
France	Maria Galante	*	17				South-Amer	isl	II
France	Martinique	*	144	8.7	13	1505	South-Amer	isl	I
France	Saint Barthelemy	*	29				South-Amer	isl	II
Great Britain	Anegada, British Virgin Islands	*	4	2.1		184	South-Amer	isl	II
Great Britain	Anguilla	*	29	19.5	6	120	South-Amer	isl	II
Great Britain	Antigua	*	66				South-Amer	isl	II
Great Britain	Antigua and Barbuda				17	1158	South-Amer	isl	II
Great Britain	Barbuda	*	14				South-Amer	isl	II
Great Britain	Bermuda	*	60	26.7	27	165	South-Amer	isl	II
Great Britain	Cayman Islands	*	218	28.8	9	539	South-Amer	isl	II
Great Britain	Guana Island, British Virgin Islands	*	84				South-Amer	isl	II
Great Britain	Jost van Dyke, British Virgin Islands	*	7				South-Amer	isl	II
Great Britain	Montserrat	*	191	21.4	16	700	South-Amer	isl	II
Great Britain	Tortola, British Virgin Islands	*	198				South-Amer	isl	II
Great Britain	Virgin Gorda, British Virgin Islands	*	107				South-Amer	isl	II
Grenada		*	24	2.2	11	1068	South-Amer	isl	II
Haiti					5	5242	South-Amer	isl	II
Haiti	Gonave	*	113				South-Amer	isl	I
Haiti	Tortuga Island	*	113				South-Amer	isl	I
Jamaica		*	23	0.7	18	3304	South-Amer	isl	II
Martinique and Guadelupe			360	17.8		1668	South-Amer	isl	I
Netherlands	Aruba	*	32	6.5	6	460	South-Amer	isl	II
Netherlands	Curacao	*	47		12		South-Amer	isl	I
Netherlands	Saba	*	38		14		South-Amer	isl	II
Netherlands	Sint Eustatius	*	36		9		South-Amer	isl	II
Netherlands	Sint Maarten	*	35		7		South-Amer	isl	II
Saint Lucia		*	101	8.4	59	1100	South-Amer	isl	II
Saint Vincent and The Grenadines					3	1150	South-Amer	isl	II
Saint Vincent and The Grenadines	Saint Vincent	*	81	6.7		1134	South-Amer	isl	II
Saint Vincent and The Grenadines	The Grenadines	*	58				South-Amer	isl	II
St Kitts and Nevis					8	659	South-Amer	isl	II
St Kitts and Nevis	Nevis	*	7				South-Amer	isl	II
St Kitts and Nevis	Saint Kitts	*	37	5.3		659	South-Amer	isl	II
Trinidad and Tobago					14	2259	South-Amer	isl	II
USA	Navassa Island	*	30	16.9		147	South-Amer	isl	II
USA	Puerto Rico	*	795	23.9	145	2538	South-Amer	isl	II
USA	United States Virgin Islands	*	284	21.1	61	1060	South-Amer	isl	II